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133006

CONTAMINATED SOIL EXCAVATION AND TREATMENT PLAN

POCONO SUMMIT HAZARDOUS WASTE SITE

FOR

LANDMARK INTERNATIONAL, LTD.
POCONO SUMMIT, PENNSYLVANIA

SUBMITTED TO

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
WILKES-BARRE, PENNSYLVANIA

SEPTEMBER 28, 1984

BCM PROJECT NO. 00-4066-01

PREPARED BY

Alan M. Robinson

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BCM EASTERN INC.
ONE PLYMOUTH MEETING MALL
PLYMOUTH MEETING, PENNSYLVANIA 19462

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1.0 INTRODUCTION

1.1 BACKGROUND

The Pocono Summit hazardous waste site is a 2.5-acre, grass covered, flat, approximately square-shaped site located in the Pocono Summit portion of Tobyhanna Township, Monroe County, Pennsylvania (Figure 1). The site is approximately 1,000 feet east of the intersection of Routes 314 and 940, in the easternmost portion of the Township.

During the mid-1970s as many as six hundred 55-gallon drums of unknown contents were stored on the site. In 1976, after the site was purchased by the current owner, LandMark International, Ltd. (LandMark), the previous owners arranged for the removal of the drums. In early 1983, it was brought to the attention of the Pennsylvania Department of Environmental Resources (PADER) that some drums may have been buried onsite. In April 1983, the PADER in cooperation with the United States Environmental Protection Agency (US EPA) conducted a site investigation.

In September 1983, BCM Eastern Inc. (BCM), on behalf of LandMark, reviewed site investigation information made available by the PADER and US EPA and prepared a "Program For Additional Investigation Site Assessment and Remedial Program Development" (Appendix 4).

1.2 SITE HYDROGEOLOGY

The site is underlain by approximately 25 feet of weathered and unweathered glacial till. The till, which is classified as ground morraine, is composed of an unsorted and unstratified mixture of boulders, cobbles, pebbles, silt, sand, and clay. Local bedrock is classified as the Packerton member of the Catskill Formation. The upper 10 feet are well-to-moderately weathered.

The fine-grained nature of the till matrix results in a low hydraulic conductivity, while the weathered and unweathered bedrock has a relatively high conductivity. Depth to the water table varies seasonally. In June and August 1984, it was approximately 15 to 25 feet below the ground surface. Groundwater beneath the site flows generally southeasterly.

The Packerton member is not considered a regionally important aquifer. No active private or public wells are directly in the anticipated path of groundwater leaving the site.

Additional soils, geologic and hydrologic information is contained in the PADER Module No. 2, prepared at the PADER's request (Appendix 1), as well as monitoring well logs (Appendix 2), and well sampling data (Appendix 3).

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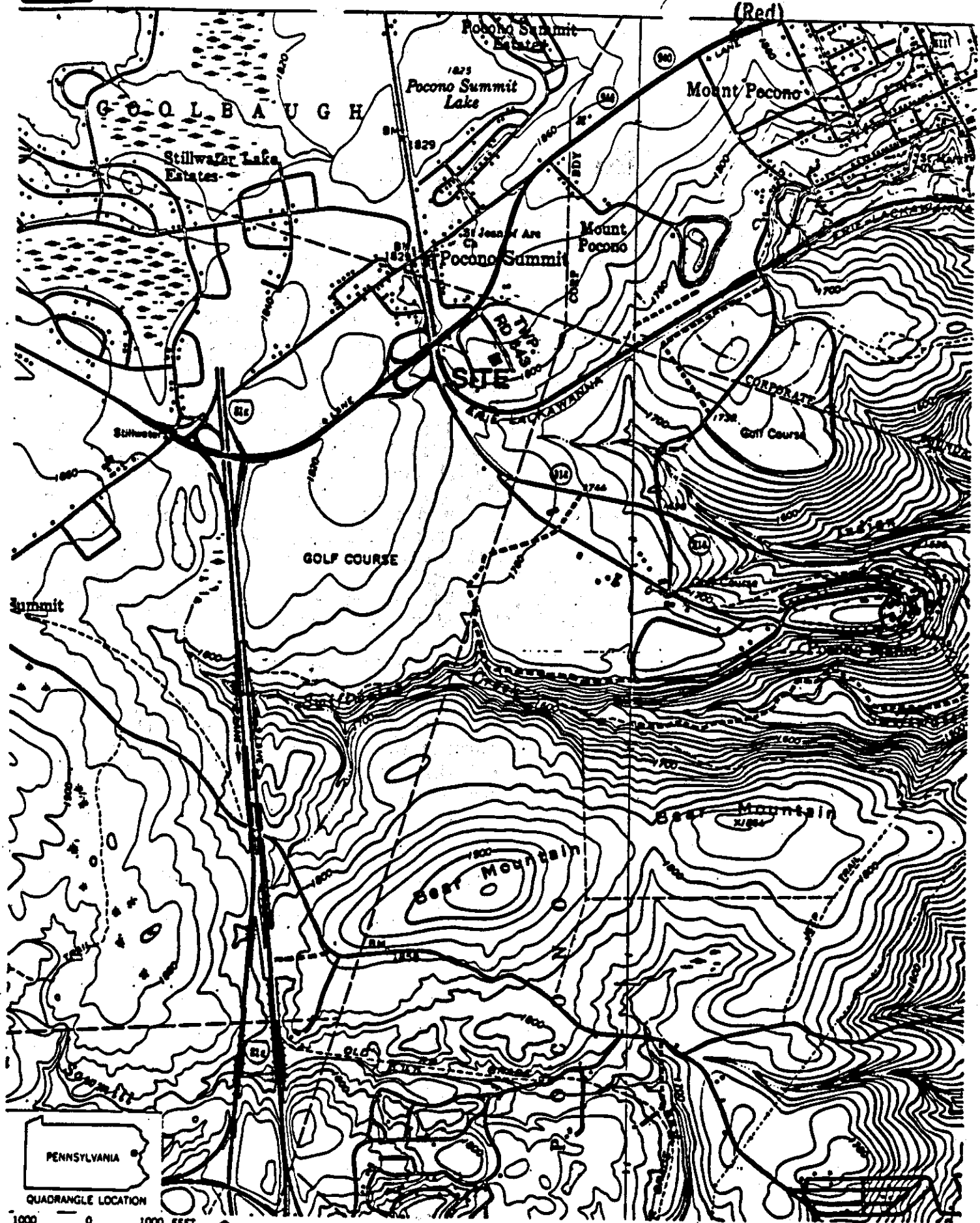

Figure 1 LOCATION MAP

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1.3 SITE INVESTIGATION

The first component of the program, the excavation of remaining drums, resulted in the removal of 70, 15, and 8-10 drums or drum liners from excavations A, B, and C, respectively (see Figure 2). No drums or other chemical waste material were found at location D. Soil sampling beneath the drumfilled zone was completed in January 1984. Elevated concentrations of several purgeable halocarbon and purgeable aromatic compounds were detected as deep as 14, 11, and 11 feet below the surface in excavations A, B, and C, respectively. Samples were not collected from greater depths. The principal compounds were xylene and ethylbenzene. Total volatile organic concentrations of the three deep-most samples ranged between 0.4 to 1.3 percent. Additional information and all soil analytical results are presented in Appendix 5.

In June, groundwater monitoring wells were installed 75 feet (W1) and 150 feet (W4) downgradient from excavation A, and 50 to 75 feet downgradient from excavations B (W2) and C (W3) (see Figure 2). Well logs are presented in Appendix 2. The wells were sampled in June and August 1984. Concentrations of purgeable halocarbons and aromatics in the groundwater were found to be several orders of magnitude lower than in the soil. The maximum total detected concentrations in the water samples were 0.29 milligrams per liter (mg/l), 0.042 mg/l, 0.049 mg/l, and 0.098 mg/l, in monitoring wells W1, W2, W3, and W4, respectively. Sampling information and analytical results are presented in Appendix 3.

The low concentrations observed in bedrock groundwater are attributed to the large contrast in hydraulic conductivity between the till and weathered bedrock. Due to a relatively low hydraulic conductivity, vertical infiltration rates and chemical loading rates through the till are correspondingly low. Flow rates through the underlying bedrock appear to be several orders of magnitude greater, which causes rapid dilution of the compounds once they reach the bedrock.

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APPROXIMATE LOCATIONS
Excavations
Water Well
Monitoring Well
SCALE 1" = 200'
Kallins Well
TWP RD 598
POCONO
RD.
TOWNSHIP
TWP RD 643
PERIMETER
A
B
C
W1
W2
W3
W4
1820
1810
1800
PENNSYLVANIA LEGISLATIVE ROUTE No. 169
TRAFFIC ROUTE No. 940
BLANSBURG
ERIE - LACKAWANNA RAILWAY

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2.0 DESCRIPTION OF EXCAVATION AND TREATMENT METHODOLOGY

2.1 MATERIAL TO BE EXCAVATED

Soil contaminated with organic solvents will be excavated at three locations: Areas A, B, and C (see Figure 2) at the Pocono Summit site. Based on preliminary excavation work, it is anticipated that approximately 300 to 350 cubic yards (cu yd) of soil will be excavated at each location. Preliminary determination of soil to be excavated for treatment will be based on results of in-field sample monitoring with a portable HNU photoionization trace gas analyzer (HNU). After excavation is completed, composite samples will be made from each side of each excavation. Excavation work will be discontinued when the purgeable halocarbon and purgeable aromatic concentrations of each sidewall are less than 5 milligrams per kilogram (mg/kg) and 10 mg/kg, respectively. Excavations will be limited to the glacial till above the weathered bedrock. The till/bedrock contact is at about 25 feet below the surface. A thin layer of till will be retained in place above the bedrock interface.

2.2 SOIL EXCAVATION METHODOLOGY

LandMark will provide all manpower and equipment to properly excavate the contaminated soil. Soil will be excavated using a backhoe, front-end loader, and/or other suitable earth-moving machinery. All excavation activities will be supervised by a BCM staff member who will direct the excavation, determine soil to be stock-piled for treatment, and obtain samples for laboratory analysis.

All BCM and LandMark personnel will be working within guidelines of the Site Safety Plan provided in Appendix 6.

2.3 SOIL TREATMENT METHODOLOGY

The contaminated soil will be treated onsite by exposure to ambient air conditions. Technically, the organic contaminants are not bound directly to the soil, but are dissolved in water in the soil. Since the contaminants in the soil water are highly volatile, exposure of the moist soil particles to the air and resultant drying will produce significant reduction in contaminant concentrations.

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To accomplish the reduction rapidly, the excavated soil will be mechanically aerated to expose the maximum quantity of soil particle surface to the air. A mechanically operated soil shredder (Royer Shredder-Mixer or equivalent) will be used.

The equipment operates as follows: The contaminated soil is placed atop a stone grate, which will remove large boulders contained in the till. The soil then falls into a catchment area containing cast iron weights designed to break up lumps, and level the depth of soil flowing up the conveyor to the shredder. The soil then drops into the shredding belt where the soil is shredded, and nonshreddable material (e.g., gravel) is discharged away from the processed material. The shredded material is forced through a sweep which regulates particle size. The shredded soil is then discharged by spraying it away from the machine. Aeration is accomplished throughout the operation, but primarily during the shredding and discharge. Equipment description and specifications are provided in Appendix 7.

The soil moisture and temperature, ambient temperature and humidity, and constituent concentrations will govern the shredder's effectiveness in volatilizing the contaminants. It is anticipated that the soil may be passed through the shredder more than once. To supplement the shredding operation, the disaggregated soil may be spread over black, 6-mil polyethylene sheeting in a 6- to 12-inch layer to enhance soil drying and chemical volatilization.

2.4 RESIDUAL CONSTITUENT CONCENTRATIONS

The concentrations to which the soil will be aerated are 5 mg/kg and 10 mg/kg, respectively, for total purgeable halocarbons and total purgeable aromatic compounds. Composite samples will be prepared from the treated soil and submitted for laboratory analysis prior to approving a soil batch for refilling into the excavation.

2.5 SOIL BACKFILL/COMPACTION

Upon achieving the acceptable residual soils concentrations, the excavations will be backfilled with the treated soil. This procedure will not begin until BCM's project manager has determined that the soil removal and treatment have been completed in accordance with the program described herein.

The fill will be placed in 1-foot lifts to minimize subsidence. Each lift will be compacted to at least 90 percent of maximum dry density. A 20-mil synthetic liner will be installed 30 inches below the surface.

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The liner, which will extend a minimum of 10 feet beyond the perimeter of each excavation, will be installed at a minimum 2 percent grade. A 6-inch permeable sand drainage layer will be installed above the liner, and decontaminated soil placed above the sand layer.

2.6 SCHEDULE

Implementation of the soil treatment program is contingent upon availability of the soil-shredding equipment and weather conditions. Soil shredding/chemical volatilization is best suited for dry soil and warm weather conditions. If the PADER approves the program by mid-October, excavation and treatment can be initiated in late October. If approval is delayed, treatment will be postponed until mid-June 1985.

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APPENDIX 1

MODULE 2

ID

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DATE PREPARED
9/26/84

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF SOLID WASTE MANAGEMENT

I. D. NUMBER

SOILS, GEOLOGY AND GROUNDWATER INFORMATION
MODULE NO. 2

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PHASE I

I. LOCATION

A. The name and date of the latest edition of the 7.5 minute topographic map covering the area is Pocono Pines, PA (original 1966; Photo revised 1973).

1. Is the required copy or, if not available, a topographic map of equivalent scale attached? X YES ___ NO

2. Is the proposed and/or existing facility shown on the 7.5 minute topographic map? X YES ___ NO

3. Supply location of the facility, measured to the nearest 0.05 inch North and West from the southeast corner of the 7.5 minute topographic map or express location in latitude and longitude. (Degrees, minutes and seconds)

(a) Sanitary Landfill
(1) Proposed North ____.____; West ____.____ Latitude ____ Longitude ____
(2) Existing North ____.____; West ____.____ Latitude ____ Longitude ____

(b) Impoundments: Locate a point at the center of each impoundment.

(1) Proposed
North ____.____; West ____.____ Latitude ____ Longitude ____
North ____.____; West ____.____ Latitude ____ Longitude ____
North ____.____; West ____.____ Latitude ____ Longitude ____
North ____.____; West ____.____ Latitude ____ Longitude ____

(2) Existing
North ____.____; West ____.____ Latitude ____ Longitude ____
North ____.____; West ____.____ Latitude ____ Longitude ____
North ____.____; West ____.____ Latitude ____ Longitude ____
North ____.____; West ____.____ Latitude ____ Longitude ____

(c) Other (describe): Areas with contaminated soil

(1) Proposed North ____.____; West ____.____ Latitude ____ Longitude ____
(2) Existing North 41°6'.39"; West 75°22'.22" Latitude ____ Longitude ____

B. Is the required large scale map showing the facility attached? X YES ___ NO

1. Is the large scale topographic map drawn to the following minimum scale? scale 1" - 200' Contour interval 10' X YES ___ NO

2. Is the following information plotted on the large scale map:

(a) Location of soils/geologic/and hydrologic test pits, wells or borings? X YES ___ NO

(b) The sprayback or leachate recirculation systems. ___ YES ___ NO X N/A

C. All of the following which occur within the site boundaries or within 0.25 mile of the site must be plotted on the large scale map and/or the 7.5 minute topographic map.

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SOILS, GEOLOGY AND GROUNDWATER INFORMATION ORIGINAL
MODULE NO. 2

PHASE I

I. LOCATION (continued)

Check the appropriate space:

	7.5 min. topo map	large scale map	not applicable
1. Water wells	X		
2. Springs	X		
3. Swamps	X		
4. Streams	X		
5. Public water supplies			X
6. Other bodies of water	X		
7. Sinkholes			X
8. Underground and/or surface mines			X
9. Mine pool discharge points			X
10 Mining spoil piles or mine dumps			X
11. Quarries			X
12. Sand and gravel pits			X
13. Gas and oil wells			X
14. Diversion ditches (existing)			X
15. All water quality monitoring points		X	
16. Occupied dwellings	X		
17 Roads	X		
18. Power lines	X		
19. Pipelines			X
20. Public buildings			X
21. Abandoned canal			X

II. SOILS

A. List each of the soil series and phases present on the site.

Soil Series - Phase

1. Lakawanna extremely stony 6 am - Entire site
2. Approximately 1 foot of stone fill was added to the side several years ago.
3.
4.
5.

B. Is the required copy of the U.S.D.A. Soil Conservation Service soil map for the area showing site boundaries attached? ___ YES X NO

C. Have borings or test pits been made to describe soils and determine their depth? X YES ___ NO

1. Are their locations shown on both the large scale map and the soils map? X YES ___ NO

2. The minimum thickness of soil to horizon(s) containing 60% or more coarse fragments is 12 inches.

a. How was soil thickness determined? Trenches

b. What is the degree of weathering of the coarse fragments? Gravel and boulders in fill are largely unweathered. Bedrock at 22-28 feet is well weathered at the surface. 2

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MODULE NO. 2

PHASE I

II. SOILS (continued)

3. Attach pit or excavation descriptions written in the following format:

Pit #	Depth	Color	Texture	Structure	Consistence	Mottling
Example:						
Pit # 1	0"-12"	dark brown	sandy loam	granular	friable	none
	12"-24"	yellowish brown	silt loam	subangular blocky	firm	none
	24"-40"	brown	loam	prismatic	hard	grayish brown mottles
	40"+	bedrock				
Pit # 2	etc. . .					
Pit # 3	etc. .					

4. Have laboratory analysis been performed and attached on samples from backhoe pits or borings to determine acceptability of soils for: a. Cover material b. renovative material

D. 1. What are the drainage characteristics of the soil? Low permiability

2. For sites proposing a natural liner for leachate collection, provide permeability in cm/sec and thickness of material in inches. (Include laboratory data) NA

E. What is the maximum slope at the proposed site? 2 percent

F. What is the shallowest depth from the surface to mottling? not observed inches

1. How was the above determined? Expected to be present

G. Is there a fragipan present? X YES ____ NO

1. What is the shallowest depth to the fragipan? 24 inches

a. How was the above determined? Field

b. Name and address of the soil scientist or geologist supplying the above data:

Name Alan M. Robinson BCM Eastern, Inc.

Street One Plymouth Meeting Mall

City and State Plymouth Meeting , PA Zip 19462

Phone number (include area code) 215-825-3800

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PHASE I

II. SOILS (continued)

Sources of Data: Berg, Sevon, and Bucek P.G.S. Atlas 204 ed, 1977, Geology and Mineral Resources of the Pocono Pines and Mt. Pocono Quadrangles, Monroe County, Pennsylvania

III. GEOLOGY

A. All of the following which occur within the site boundary or within 0.25 mile of the site are to be plotted on the large scale map and the 7.5 minute topographic map.

1. Location (s) of maximum and minimum thickness of glacial deposits See well logs.
2. Lithologies See well logs
3. Areas where bedrock outcrops NA
4. Faults NA
5. Lineaments NA
6. Fracture traces NA
7. Directions of ground water flow

B. Sediments

1. Is the site within the glaciated area of Pennsylvania? X YES ____ NO

2. Are there
   a. glacial deposits present under the propose site? X YES ____ NO
   b. colluvial deposits ____ YES ____ NO
   c. alluvial deposits ____ YES ____ NO
   d. lacustrine deposits ____ YES ____ NO

3. Describe the type and texture of the unconsolidated materials:
   Till deposits, composed of an unsorted and non-stratified mixture of clay, silt, sand, pebbles, cobbles, and boulders.

4. What is their maximum thickness? 28 feet

5. What is their minimum thickness? 25 feet

6. How were the thicknesses determined? Well borings

7. Are the location(s) of maximum and minimum thicknesses shown on the large scale map? X YES ____ NO

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PHASE I

III. GEOLOGY (continued)

8. Discuss the effects of these materials on discharges from the proposed facility.

N/A

C. Bedrock

1. Formation name Catskill Formation

2. Lithologies (plot on large scale map if more than one lithology)

Packertown member.

3. Is the location of all places where the bedrock is less than 5 feet plotted on the large scale map? N/A YES ____ NO

4. How were the locations determined? N/A

5. Does bedrock crop out within the boundaries or within 200 feet of the proposed facility? ____ YES X NO

6. Are all outcrops shown on the large scale map? N/A YES ____ NO

D. Weathering

1. Characterize the degree of weathering Bedrock is highly weathered (see well logs).

2. Has a saprolite developed on the bedrock? ____ YES X NO

a. What is the shallowest depth from the surface to bedrock 25 feet.

b. Describe the texture Highly weathered shale and sandstone

3. If bedrock is a carbonate rock: N/A

a. Are there any undrained surface depressions or sinkholes at the site? ____ YES ____ NO

b. Are all sinkholes within 0.25 mile of the site shown on the 7.5 minute topographic map and/or on the large scale map? ____ YES ____ NO.

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III. GEOLOGY (continued)

E. Structure

1. Are all lineaments and fracture traces on the site and within 0.25 miles of the site located on the 7.5 minute topographic map and/or the large scale map? ____YES X NO

2. Briefly characterize these fractures, joints, etc. and discuss their control on the movement of infiltrating water and ground water. Groundwater flows in the highly weathered bedrock and in fractures within less weathered bedrock.

3. Describe the regional structure of bedrock in the area of the site? Very gently dipping sedimentary formations.

4. Give a detailed description of the local structure N/A

5. Describe folding as it applies to the site N/A

   a. Strike and plunge of fold axis are:
      Strike N/A Plunge N/A
   b. Location of site in relation to local structure N/A

6. Attitude of bedding N/A
   a. Strike _____ and dip _____ of _____ formation.
   b. Strike _____ and dip _____ of _____ formation.
   c. Strike _____ and dip _____ of _____ formation.

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III. GEOLOGY (continued)

PHASE I

d. Are there extractable coal seams beneath the site that are not being presently mined? ____YES X N

e. If "d" is yes, would mining these coal seams have any effect on the proposed facility? ____YES ____N

Sources of Data:

Berg, Sevon, and Bucek P.G.S. Atlas 204 ed., 1977 Geology and Mineral Resources of the Pocono Pines and Mt. Pocono Quadrangles, Monroe County, PA

Comments: (Attach additional sheets if necessary)

Name and address of geologist supplying the above data:

Name: Alan M. Robinson, BCM Eastern, Inc.

Street: One Plymouth Meeting Mall

City & State: Plymouth Meeting, PA Zip 19462

Phone Number (Include area code): (215) 825-3800 ext. 334

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MODULE NO. 2

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III. GEOLOGY (continued)

7. Attitude of jointing
   a. Strike _____ and dip _____ of joints.
   b. Strike _____ and dip _____ of joints. Not known
   c. Strike _____ and dip _____ of joints.

8. What is the respective spacing of these joints?
   a. Not known
   b. _____
   c. _____

9. Are joints open? (explain) _____YES _____NO
   a. Not known
   b. _____

10. Cleavage N/A
   a. Strike _____ and dip _____ of cleavage.
   b. Strike _____ and dip _____ of cleavage.
   c. Strike _____ and dip _____ of cleavage.

11. Faults N/A
   a. Strike _____ and dip _____ of faults.
   b. Strike _____ and dip _____ of faults.
   c. Strike _____ and dip _____ of faults.

12. Are the locations of all faults that occur within 0.25 mile of the site's boundaries shown on the large scale map and 7.5 minute topographic map? N/A _____YES _____NO

F. Land Use

1. Are there any active or inactive *surface* mines at the site or within the site property boundaries? _____YES X NO
   If inactive, are they under a Surface Mining Bond? _____YES X NO

2. Are there any active or inactive *deep* mines at the site or within 0.25 mile of the site boundaries? _____YES X NO
   a. What is the minimum depth to mined-out area? _____ feet
   b. What is the aerial extent of the mined-out area? _____
   c. What mineral resource was extracted? N/A
      (1) If coal, name the seam(s) that were mined. _____

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PHASE I

IV. HYDROLOGY

A. Have test pits X, borings X, or wells X (check one or more) been made for the hydrologic investigation? X YES ____ N

1. Is the required complete geologic description (log) of all earth materials penetrated included? ____ YES ____ N

2. If a well, what was the method of drilling? Air Rotary & Air Hammer

B. Depth to ground water table

1. The maximum depth to the water table within the site is 28.85 feet.

   a. Date of measurement 6/15/84.

   b. The location is shown on the 7.5 minute Well 4 or large scale ____ map (check one)

   c. If measurement is from a well or pit, give date of completion for same 6/13/84

2. The minimum depth to the water table within the site is 16.3 feet.

   a. Date of measurement 6/15/84.

   b. Is the location shown on the 7.5 minute Well 3 or large scale ____ map (check one)

   c. If measurement is from a well or pit, give date of completion for same 6/12/84

3. Describe seasonal water table fluctuations at the above locations.
   Water level is anticipated to fluctuate. It is underpressure from bedrock.

4. Describe all perched or special water table conditions. Minimum depth to the perched water table is 3 feet + possible.
   Fragipan may contribute to the formation of a perched water table during the months of November through March.

5. Does ground water drain to deep mines? ____ YES X NO

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MODULE NO. 2

IV. HYDROLOGY (continued) PHASE I

C. Have you shown the direction (s) of ground water movement from the site on the _____ large scale or yes 7.5 minute map (check one)?

a. Describe how the above was determined:
Four monitoring well water levels, office building well, ground surface, and topographic map.

b. The location of the ground water discharge point(s) affected by this facility is Indian Run

c. Discuss the rate of ground water flow at this site as it applies to the operation of this facility:
N/A

existing wells

D. Describe below the ~~proposed~~ ground water quality monitoring points for approval. (For sanitary landfills, monitoring point proposals are subject to final approval of the Engineering Design Plans. No wells are to be drilled until final approval of the Engineering Design Plans.) Use numbers only and number all monitoring points consecutively.

1. Wells, (check one). For multiple wells indicate with monitoring point number (a) for existing and (b) for proposed.

(a) _____ For existing wells complete the table below.

(b) _____ For proposed new well construction, complete the table from your specifications.

Monitoring Point Number	Drilling Method	Depth	Diameter	Casing		Location *2		Elevation
				Size & Depth	Zones *1 Perforated	Inches North	Inches West	
1	Air/rotary	39'	8"	4"/39'	39-19'			
2	Air/Hammer	32'67'	10"	4"/35'	35-20'			
3	"	35'	10"	4"/35'	35-15'			
4	"	37'	10"	4"/37'	37-17'			

*1 What zones or at what depth is the casing perforated?
*2 Measured from the southeast corner of the 7.5 minute topographic map.

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PHASE I

2. Springs No springs on or adjacent to site

Monitoring Point Number	Elevation	Rate of Flow (gpm)	Date of Measurement	Location*	
				Inches North	Inches West

*Measured from the southeast corner of the 7.5 minute topographic map

E. Do all springs listed have a continuous year-round flow? _____YES _____NO

1. If not, explain _____

F. Other - Describe and locate.

FOR DEPARTMENT USE ONLY:

Proposed monitoring point locations and construction approved:

Name: _____ Date _____

Comments: _____

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COMMONWEALTH OF PENNSYLVANIA
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BUREAU OF SOLID WASTE MANAGEMENT

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SOILS, GEOLOGY AND GROUNDWATER INFORMATION MODULE NO. 2

PHASE I

IV. HYDROLOGY (continued)

Name and address of geologist or hydrogeologist supplying the above data:

Name: Alan M. Robinson

Street: One Plymouth Meeting Mall

City & State: Plymouth Meeting, PA 19462

Phone Number (include area code) (215) 825-3800 ext. 334

Sources of Data:

Comments: (attach additional sheets if necessary)

V. CLIMATOLOGY AND FLOODING · N/A

A. Will this be an all-season operation? ____YES ____NO

1. If seasonal, include operating dates: _____ to _____.

B. Precipitation data: For a sanitary landfill requiring collection and treatment of leachate complete 1, 2, 3, 4, 5, & 6.
For impoundments complete 2, 5, & 6.
For sprayback complete 3, 4, 5, & 6.

1. Maximum precipitation — inches/yr. _____
2. Average precipitation — inches/yr. _____
3. Maximum monthly precipitation — Month _____ in. _____
4. Minimum monthly precipitation — Month _____ in. _____
5. Station of record _____
6. Length of historical record _____

AR100043

ER-SWM-15: Rev. 1/90

DATE PREPARED

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF SOLID WASTE MANAGEMENT

I. D. NUMBER

SOILS, GEOLOGY AND GROUNDWATER INFORMATION
MODULE NO. 2

PHASE I

V. CLIMATOLOGY AND FLOODING (continued)

C. Flooding Frequency

1. Will all or part of the site be inundated? (check one)

a. ____ once in 5 years or more
b. ____ once in 10 years
c. ____ once in 25 years
d. ____ once in 50 years
e. ____ once in 100 years
f. X never

D. Source of flooding information _____

STORAGE OR TREATMENT OF WASTES

VI. IMPOUNDMENTS N/A

Answer the following questions for impoundments only:

A. How will the sides and bottom of the impoundment be made impervious? ____YES ____NO

Briefly describe or explain: _____

B. Will the surrounding area be graded or diked to prevent surface water from entering the impoundment? ____YES ____NO

Briefly describe or explain _____

AR100011

ER-SWM-15: Rev. 1/80

DATE PREPARED

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF SOLID WASTE MANAGEMENT

ORIGINAL (Red)

I. D. NUMBER

SOILS, GEOLOGY AND GROUNDWATER INFORMATION
MODULE NO. 2

PHASE I

IV. IMPOUNDMENTS (continued)

C. Will the sides be constructed to maintain a two (2) foot freeboard, and be protected against wave action? _____YES _____NO

D. How will the impoundment be protected from acts of third parties? _____

_____

E. Provide plans for the vegetation of outside slope. _____YES _____NO

AR100045

BCM

ORIGINAL
(Red)

APPENDIX 2

MONITORING WELL LOGS

Betz·Converse·Murdoch·Inc. BCM

ORIGINAL (Red)

Drilling Log

Well Number W1

Client Landmark International, Ltd. Project No. 00-4066-01
Well Location 50 feet south of excavation A
Driller/Company Dick Schmoyer - Mayer's Brothers Quakertown, PA
Drilling Method Air Hammer Hole Diameter 8" Date(s) Drilled 6/5/84
Sample Type Cuttings Sample Interval 5' No. Samples Retained .0
Surface Elevation Casing Top Elevation Total Well Depth 39'
Casing Material and Size Schedule 40 PVC, 4-Inch ID Cased Interval(s) 19.0'
Grouting Type Portland cement and sand, Bentonite pellet Grouted Interval 17-0'
Screening Material and Size .015 slot PVC Screened Interval(s) 39-19
Packing Material and Size Jessie Morie No. 1 sand Packed Interval 39-17
Depth to Static Water 18.69' (PVC) Date 6/15/84 Approx Well Yield
Development Method Development Time
Logged by: Rick Sacks/John Fowler

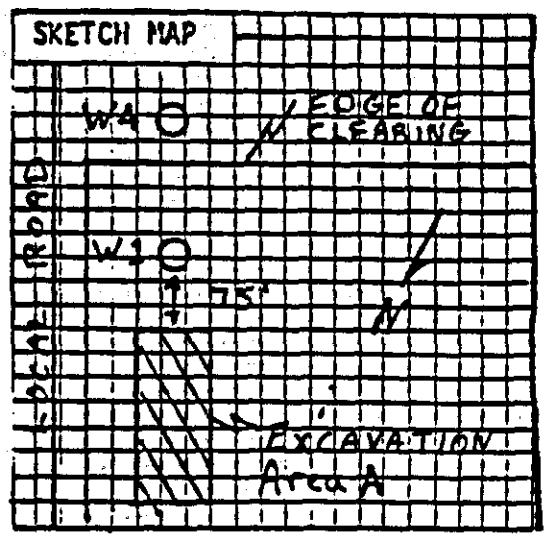
Comments
Drilled to 15'
HNU = 3-4 ppm in hole

Moved Hole approx. 25' further from excavation

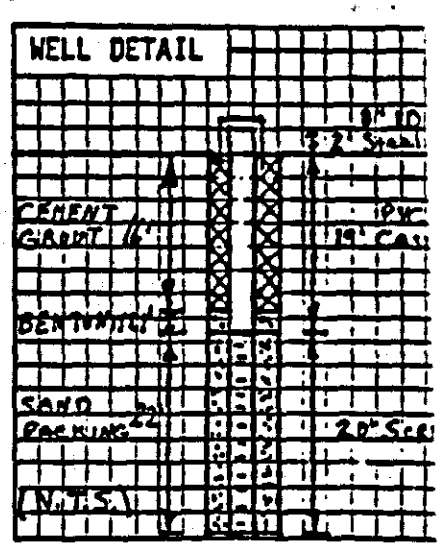
OVA readings 60 ppm fluctuating after: 23'

HNU 2 ppm @ 23'

SKETCH MAP



WELL DETAIL



Depth Scale	Sample	Spoon Blows	Description of Materials
0-28'			SILT, SAND, GRAVEL, little clay
			Boulder @ 8-9'
			Wet at 23' - minor water bearing zone
28-33'			Very moist, red brown, fissile, weathered SHALE
33-39'			Wet, gray, fine to medium grained SANDSTONE
			Hard at 37'
			Bottom of hole 39'

AR100047

Betz·Converse·Murdoch·Inc. BCM

ORIGINAL (Red)

Drilling Log

Well Number W2

Client LandMark, International, Ltd. Project No. 00-4066-01
Well Location South of excavation B
Driller/Company R. Schmoyer - Mayer's Brothers, Quakertown, PA
Drilling Method Air Hammer Hole Diameter 10" Date(s) Drilled 6/12/84
Sample Type Cuttings Sample Interval 5' No. Samples Retained 0
Surface Elevation Casing Top Elevation Total Well Depth 32.67
Casing Material and Size Schedule 40 PVC, 4-Inch ID Cased Interval(s) 32.67-0'
Grouting Type Portland cement and sand, Bentonite pellets Grouted Interval 16-0'
Screening Material and Size .015 slot PVC Screened Interval(s) 32.67-1
Packing Material and Size Jessie Morie No. 1 sand Packed Interval 32.67-16'
Depth to Static Water 18.42' (PVC) Date 06/15/84 Approx Well Yield +10 gpm
Development Method Pump Development Time 1 hour
Logged by: John Fowler

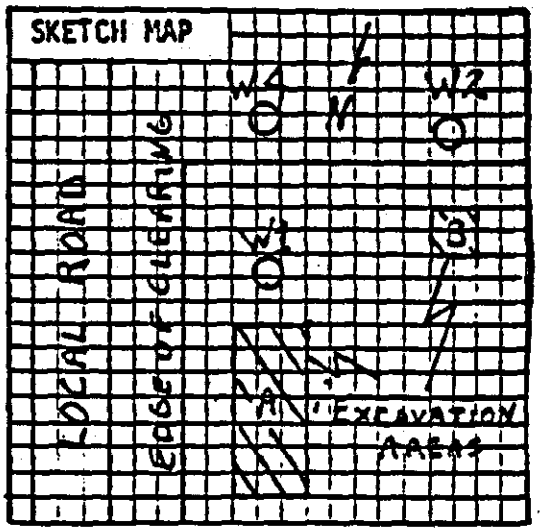
Comments
Bentonite pellet seal from 16-14.25'

Drilled to 35' hole caved to 32.67'

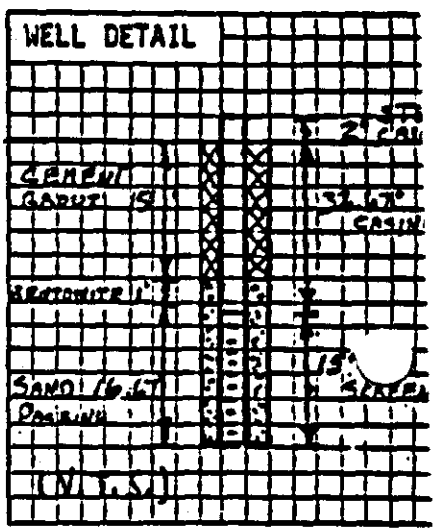
Water levels:
14.58' at 11:10 a.m.
14.21' at 12:07 p.m.
6/12/84

No OVA reading above background

SKETCH MAP



WELL DETAIL



Depth Scale	Sample	Spoon Blows	Description of Materials
0'-5'			Moist, brown silty SAND/sandy SILT with some gravel
5'-10'			Moist, sandy silty GRAVEL trace clay (sandstone and red shale gravel)
10'-15'			Moist, brown/red brown sandy silty GRAVEL
15'-20'			Very moist, red-brown, gravelly, sandy SILT
20'-25'			Very moist, red-brown, sandy, silty, clayey, GRAVEL (shale saprolite) water at 25'
25'-35'			Red-brown sandy, silty, highly weathered, SHALE and SANDSTONE
			Harder drilling at 34.5' gray sandstone
			Bottom of hole 35'

AR100048

Betz·Converse·Murdoch·Inc. BCM

ORIGINAL (Red)

Drilling Log

Well Number W-3

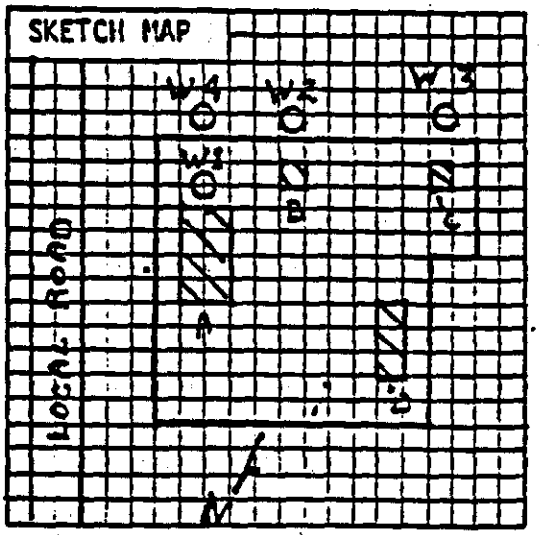
Client Landmark International Ltd. Project No. 00-4066-01
Well Location South of Excavation C
Driller/Company R. Schmoyer/Mayer's Brothers, Quakertown, PA
Drilling Method Air Hammer Hole Diameter 10" Date(s) Drilled 6/12/84
Sample Type Cuttings Sample Interval 5' No. Samples Retained 0
Surface Elevation Casing Top Elevation Total Well Depth 35
Casing Material and Size Schedule 40 PVC, 4-inch ID Cased Interval(s) 15'-0
Grouting Type Portland cement and sand, bentonite pellet Grouted Interval 16'-0
Screening Material and Size .015 slot PVC Screened Interval(s) 35'-1
Packing Material and Size Jessie Morie No. 1 sand Packed Interval 35'-1
Depth to Static Water 16.29' (PVC) Date 6/15/84 Approx Well Yield + 15 gpm
Development Method pump Development Time 2 hour
Logged by: J. Fowler

Comments
Bentonite pellet scale 16'-14'

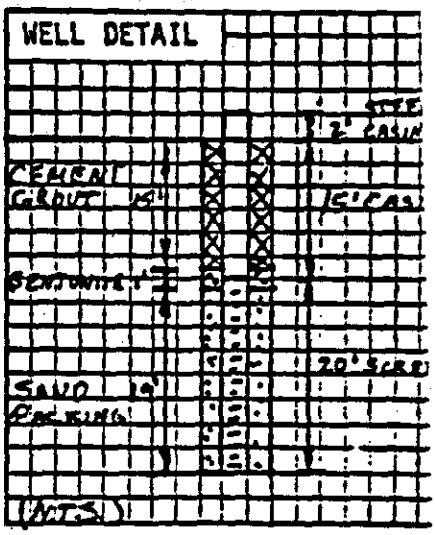
No OVA reading above background

Water level: 13.5' at 2:05 p.m. 6/12/84

SKETCH MAP



WELL DETAIL



Depth Scale	Sample	Spoon Blows	Description of Materials
0'- 5'			Moist, yellow-brown, clayey, silty, sandy, GRAVEL/grave SAND
5'-10'			Moist, red-brown, silty, gravelly SAND/sandy GRAVEL maximum diameter ½"
10'-15'			Moist, red-brown, sandy, silty GRAVEL
15'-20'			Moist, dark brown, silty, gravelly, SAND
20'-25'			Moist/very moist, dark brown, silty, sandy GRAVEL water at 25' 2-5 gpm
25'-30'			Wet, red-brown, silty, sandy, GRAVEL
30'-35'			Wet, gray, weathered SANDSTONE
			END OF HOLE

Betz·Converse·Murdoch·Inc. BCM

ORIGINAL (Red)

Drilling Log

Well Number W-4

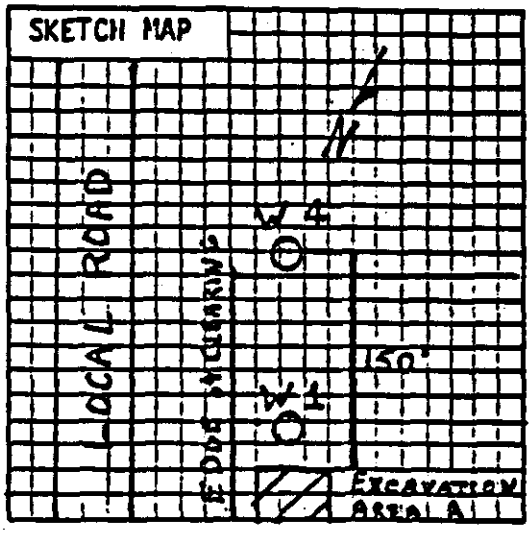
Client Landmark International Ltd. Project No. 00-4066-01
Well Location 150 feet south of excavation A
Driller/Company R. Schmoyer/Mayer's Brothers Quakertown, PA
Drilling Method Air Hammer Hole Diameter 10" Date(s) Drilled 6/13/84
Sample Type cuttings Sample Interval No. Samples Retained 0
Surface Elevation Casing Top Elevation Total Well Depth 37
Casing Material and Size Schedule 40 PVC, 4-inch ID Cased Interval(s) 7'-0'
Grouting Type Portland Cement and sand, Bentonite pellets Grouted Interval 15'-0'
Screening Material and Size .015 PVC slot Screened Interval(s) 37'-17
Packing Material and Size Jessie Morie No. 1 sand Packed Interval 37'-15
Depth to Static Water 28.85'(PVC) Date 6/15/84 Approx Well Yield <3 gpm
Development Method Development Time
Logged by: J. Fowler

Comments
15-13' Bentonite pellet seal

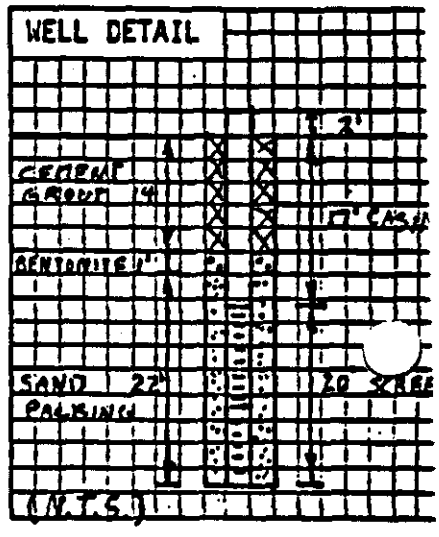
Water level:
10' at 2:45 pm 6/13/84

No OVA reading above background

SKETCH MAP



WELL DETAIL



Depth Scale	Sample	Spoon Blows	Description of Materials
0-5'			Moist, brown, sandy, clayey SILT with some gravel
5-10'			Moist, brown, silty, SAND, trace gravel
10-25'			Moist, brown, silty, sandy GRAVEL Boulders encountered 6-8" diameter 10-15'
15-20'			Moist, red-brown, sandy, silty GRAVEL (highly weathered shale-sandstone)
27'			Moist, red-brown highly weathered SHALE
27-30'			Moist/very moist weathered SANDSTONE 2 gpm at 30'
30-37'			Wet gray weathered SANDSTONE
			Bottom of hole @ 37'

AR100050

BCM

ORIGINAL
(Red)

APPENDIX 3

SAMPLING AND GROUNDWATER ANALYTICAL RESULTS

BETZ CONVERSE MURDOCH INC
GROUNDWATER SAMPLING FIELD DATA SHEET

Client LAND MARK
Location Ponoco Summit
Contact Person _____ Phone No. _____
Sampling Team Tim, Russ.
Reason for Sampling _____

Date 6-15-84
Project No. _____
Weather MILD, Cool, Cloudy

Apple sheet

Well	Depth to GW w/reference	Well Depth	Well Diameter	Well Volume	Evacuate Volume	Evacuate Method	Groundwater pH	Groundwater Cond.	Groundwater Temp.	Sampling Time	Sampling Method	Well Yield-Recovery
4 1	18'8¼" Top of P.V.C.	40'	4"	15.4	200+ gals	SUB. Pump.	6.3	220	48°F	2:45	teflon Bailer	Muddy to start cleared after first 3 gal See Below
2 2	18'5" Top of PVC	40'	4"	15	150 gal	Fuji Pump.	5.6	52	44°F	12:15 pm	Teflon bailer	First 20 gal muddy then cleared Great Yield 20 gpm+
1 3	16'3½" PVC	40'	4"	15.1 gal	150+ gal	Fuji	5.1	38	46°F	10:50 AM	Teflon BAiler	muddy to start cleared after 3 gal Great Yield 20 gpm+
3 4	28'10¼" PVC.	40'	4"	7.8	100 gal	sub pump	6.2	102	47°F	1:30 pm	teflon bailer	First 20 gal muddy then cleared somewhat 3-4 gpm Yield
												Very muddy to start Cleared up some. Now getting muddy Again Pumped AT 10 g p.m+

FIELD BLANK TAKEN AT WELL 2 From the 5 gal DIST. WATER JUG.

NOTE: Site Personal were Blowing Well # 4 with Air Compressor when we arrived.

Steel Outer CASINGS were being INSTALLED while we were SAMPLING. READINGS ARE TO TOP OF PVC inner

ORIGINAL (Red)

AR100052

BCM Laboratory Division
521 W. GERMANTOWN PIKE
NORRISTOWN, PA 19401
215-825-0447

ASE REMIT CHECKS TO:
BCM Eastern Inc.
1 PLYMOUTH MEETING
PLYMOUTH MEETING, PA 19462
215-825-3600

ORIGINAL
(Red)

CLIENT

POCONO SUMMIT
ALAN ROBINSON
BCM MAIL
PA

00-7014-79 7/6/84

FINAL REPORT REF: 00-4066-01 PAGE 1

This is the final report for the samples shown below. If you have questions concerning this report please call 215-825-0447.

BCM NUMBER		N409654	N409655	N409656	N409657
CLIENT SAMPLE ID		WELL #1	WELL #2	WELL #3	WELL #4
DATE SAMPLED		6/15/84	6/15/84	6/15/84	6/15/84
DATE RECEIVED		6/18/84	6/18/84	6/18/84	6/18/84
TEST AND UNITS	(ANAL. METH.)				
TOTAL XYLENES UG/L	(71)	66.1	<1.0	<1.0	<1.0
PURG ORGANICS BY GC	(141)				
CHLOROMETHANE UG/L		<1.0	<1.0	<1.0	<1.0
BROMOMETHANE UG/L		<1.0	<1.0	<1.0	<1.0
VINYL CHLORIDE UG/L		<1.0	<1.0	<1.0	<1.0
CHLOROETHANE UG/L		<1.0	<1.0	<1.0	<1.0
METHYLENE CHLORIDE UG/L		<1.0	<1.0	<1.0	<1.0
TRICHLOROFLUOROMETHANE UG/L		<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHENE UG/L		<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHANE UG/L		8.2	<1.0	<1.0	7.2
TRANS-1,2-DICHLOROETHENE UG/L		22.7	<1.0	<1.0	3.6

AR100053

PAYMENT IS DUE UPON RECEIPT OF INVOICE. PAST DUE AMOUNTS OVER 30 DAYS WILL BE SUBJECT TO AN INTEREST RATE OF 18% PER ANNUM.

BCM Laboratory Division
521 W. GERMANTOWN PIKE
NORRISTOWN, PA 19401
215-825-0447

PLEASE REMIT CHECKS TO:
BCM Eastern Inc.
1 PLYMOUTH MEETING
PLYMOUTH MEETING, PA 19462
215-825-3800

ORIGINAL
(Red)

CLIENT [redacted]

POCONO SUMMIT 00-701479

BCM NUMBER	N409654	N409655	N409656	N409657
CHLOROFORM UG/L	<1.0	<1.0	<1.0	<1.0
1,2-DICHLOROETHANE UG/L	<1.0	<1.0	<1.0	<1.0
1,1,1-TRICHLOROETHANE UG/L	108.	10.8	<1.0	35.8
CARBON TETRACHLORIDE UG/L	<1.0	<1.0	<1.0	<1.0
BROMODICHLOROMETHANE UG/L	<1.0	<1.0	<1.0	<1.0
1,2-DICHLOROPROPANE UG/L	<1.0	<1.0	<1.0	<1.0
TRANS-1,3-DICHLOROPROPENE UG/L	<1.0	<1.0	<1.0	<1.0
TRICHLOROETHENE UG/L	20.4	1.4	<1.0	1.3
DIBROMOCHLOROMETHANE AND/OR 1,1,2-TRICHLOROETHANE AND/OR CIS-1,3-DICHLOROPROPENE UG/L	<1.0	<1.0	<1.0	<1.0
BROMOFORM UG/L	<1.0	<1.0	<1.0	<1.0
1,1,2,2-TETRACHLOROETHANE AND/OR TETRACHLOROETHENE UG/L	<1.0	<1.0	<1.0	<1.0
BENZENE UG/L	8.1	<1.0	<1.0	7.4

AR100054

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BCM Laboratory Division
521 W. GERMANTOWN PIKE
NORRISTOWN, PA 19401
215-825-0447

PLEASE REMIT CHECKS TO:
BCM Eastern Inc.
1 PLYMOUTH MEETING
PLYMOUTH MEETING, PA 19462
215-825-3800

ORIGINAL
(Red)

FINAL REPORT 7/6/84 PAGE 3

CLIENT

POCONO SUMMIT 00-701479

BCM NUMBER	N409634	N409635	N409636	N409637
TOLUENE UG/L	60.2	<1.0	<1.0	6.7
CHLOROBENZENE UG/L	<1.0	<1.0	<1.0	<1.0
ETHYL BENZENE UG/L	<1.0	<1.0	<1.0	<1.0
1,3-DICHLOROBENZENE UG/L	<1.0	<1.0	<1.0	<1.0
1,4-DICHLOROBENZENE UG/L	<1.0	<1.0	<1.0	<1.0
1,2-DICHLOROBENZENE UG/L	<1.0	<1.0	<1.0	<1.0
	295.7			62

AR100055

PAYMENT IS DUE UPON RECEIPT OF INVOICE. PAST DUE AMOUNTS OVER 30 DAYS WILL BE SUBJECT TO AN INTEREST RATE OF 18% PER ANNUM.

BCM Laboratory Division
521 W. GERMANTOWN PIKE
NORRISTOWN, PA 19401
215-825-0447

PLEASE REMIT CHECKS TO:
BCM Eastern Inc.
1 PLYMOUTH MEETING
PLYMOUTH MEETING, PA 19462
215-825-3800

FINAL

FINAL REPORT 7/6/84 PAGE 4

CLIENT

POCONO SUMMIT 00-701479

BCM NUMBER		N409636
CLIENT SAMPLE ID		FIELD BLANK
DATE SAMPLED		6/15/84
DATE RECEIVED		6/18/84
TEST AND UNITS	(ANAL. METH.)	
TOTAL XYLENES UG/L	(71)	<1.0
PURG ORGANICS BY GC	(141)	
CHLOROMETHANE UG/L		<1.0
BROMOMETHANE UG/L		<1.0
VINYL CHLORIDE UG/L		<1.0
CHLOROETHANE UG/L		<1.0
METHYLENE CHLORIDE UG/L		<1.0
TRICHLOROFLUOROMETHANE UG/L		<1.0
1,1-DICHLOROETHENE UG/L		<1.0
1,1-DICHLOROETHANE UG/L		<1.0
TRANS-1,2-DICHLOROETHENE UG/L		<1.0

PAYMENT IS DUE UPON RECEIPT OF INVOICE. PAST DUE AMOUNTS OVER 30 DAYS WILL BE SUBJECT TO AN INTEREST RATE OF 18% PER ANNUM.

BCM Laboratory Division
521 W. GERMANTOWN PIKE
NORRISTOWN, PA 19401
215-825-0447

PLEASE REMIT CHECKS TO:
BCM Eastern Inc.
1 PLYMOUTH MEETING
PLYMOUTH MEETING, PA 19462
215-825-3600

ORIGINAL
(Red)

FINAL REPORT 7/6/84 PAGE 5

CLIENT

POCONO SUMMIT 00-701479

BCM NUMBER	N409658
CHLOROFORM UG/L	<1.0
1,2-DICHLOROETHANE UG/L	<1.0
1,1,1-TRICHLOROETHANE UG/L	<1.0
CARBON TETRACHLORIDE UG/L	<1.0
BROMODICHLOROMETHANE UG/L	<1.0
1,2-DICHLOROPROPANE UG/L	<1.0
TRANS-1,3-DICHLOROPROPENE UG/L	<1.0
TRICHLOROETHENE UG/L	<1.0
DIBROMOCHLOROMETHANE AND/OR	
1,1,2-TRICHLOROETHANE AND/OR	
CIS-1,3-DICHLOROPROPENE UG/L	<1.0
BROMOFORM UG/L	<1.0
1,1,2,2-TETRACHLOROETHANE AND/OR	
TETRACHLOROETHENE UG/L	<1.0
BENZENE UG/L	<1.0

PAYMENT IS DUE UPON RECEIPT OF INVOICE. PAST DUE AMOUNTS OVER 30 DAYS WILL BE SUBJECT T

AR100057

INUM.

BCM Laboratory Division
521 W. GERMANTOWN PIKE
NORRISTOWN, PA 19401
215-825-0447

PLEASE REMIT CHECKS TO:
BCM Eastern Inc.
1 PLYMOUTH MEETING
PLYMOUTH MEETING, PA 19462
215-825-3800

ORIGINAL
(Red)

FINAL REPORT 7/6/84 PAGE 5

CLIENT

POCONO SUMMIT 00-701479

BCM NUMBER	N409658
TOLUENE UG/L	<1.0
CHLOROBENZENE UG/L	<1.0
ETHYL BENZENE UG/L	<1.0
1,3-DICHLOROBENZENE UG/L	<1.0
1,4-DICHLOROBENZENE UG/L	<1.0
1,2-DICHLOROBENZENE UG/L	<1.0

LAB CERT. : EPA/PA-#38007, NJ-#77175, AL- #40330, EPA BULK ASBESTOS Q-#3339
AIHA/NIOSH-# 241/19401

METHODS : 71) EPA # 602 141) EPA #624

END OF REPORT

PAYMENT IS DUE UPON RECEIPT OF INVOICE. PAST DUE AMOUNTS OVER 30 DAYS WILL BE SUBJECT TO [redacted] UM.

AR100058

Hess Environmental Laboratories.
Environmentalists and Laboratory Analysts.
304 Park Avenue, Stroudsburg, Pennsylvania 18360.
Telephone (717) 421-1550.

ORIGINAL
(Red)

September 25, 1984

Mr. W. Jack Kalins
Landmark International, Inc.
Box 148
Pocono Summit, PA 18347

SUBJECT : Analysis of Monitoring Wells

Dear Mr. Kalins:

Four monitoring wells located in upper N.E. Tobyhanna Township, Monroe County, Pennsylvania were analyzed for purgeable halocarbons, purgeable aromatics and xylenes. The monitoring wells were sampled and analyzed according to EPA protocol as detailed in the Federal Register and sampled in the recommended order (2,3,4,1).

The results of the analyses are listed in Tables 1 and 2. All results are reported in ug/l. Components listed as either 0.5 or 1.0 ug/l were not detected, while components reported as trace were apparently detected, but were below our listed limit of quantitation.

The depth to water levels (feet) as measured by a Hess Laboratory representative were as follows:

Monitoring Well #1 - 25
Monitoring Well #2 - 20
Monitoring Well #3 - 20
Monitoring Well #4 - 23

We appreciate the opportunity to assist you in your environmental testing. Please call me if you have any questions.

Very Truly Yours,

Michael L. Klusaritz

Michael L. Klusaritz, Director
Hess Environmental Laboratories

cc: Allan Robinson, B.C.M.

MLK/kag

AR100059

Hess Environmental Laboratories.
Environmentalists and Laboratory Analysts.
561 Park Avenue, Stroudsburg, Pennsylvania 18360.
Telephone (717) 421-1550.

Table 1

Purgable Halocarbons (ug/l)

Component	Monitoring Well #1 (6928)	Monitoring Well #2 (6925)	Monitoring Well #3 (6926)	Monitoring Well #4 (6927)
Chloromethane	Trace	< 0.5	< 0.5	< 0.5
Chloroform	19.2	10.6	2.0	12.0
Bromodichloromethane	Trace	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride	< 0.5	< 0.5	Trace	Trace
1,2-Dichloroethane	9.9	< 0.5	< 0.5	1.9
1,1,1-Trichloroethane	39.2	8.1	6.7	12.1
1,1-Dichloroethane	44.1	12.5	< 0.5	12.2
trans-1,2-Dichloroethylene	< 0.5	< 0.5	1.9	3.9
Tetrachloroethylene	2.0	< 0.5	< 0.5	< 0.5
Trichloroethylene	116.2	10.5	38.8	56.1

The following compounds were not detected in any sample and are reported as < 0.5 ug/l:

Bromomethane
Vinyl chloride
Chloroethane
Bromoform
Dibromochloromethane
1,1,2-Trichloroethane
1,2-Dichloropropane
Trans and cis-1,3-Dichloropropene
Methylene Chloride

AR100060

Hess Environmental Laboratories.
Environmentalists and Laboratory Analysts.
304 Park Avenue, Stroudsburg, Pennsylvania 18360.
Telephone (717) 421-1550.

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Table 2

Purgable Aromatics

Component	Monitoring Well #1 (6928)	Monitoring Well #2 (6925)	Monitoring Well #3 (6926)	Monitorin Well #4 (6927)
Benzene	16.5	< 1.0	< 1.0	5.4
Chlorobenzene	1.0	< 1.0	< 1.0	Trace
1,2-Dichlorbenzene	Trace	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	10.7	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	Trace	< 1.0	< 1.0	< 1.0
Ethylbenzene	Trace	< 1.0	< 1.0	< 1.0
Toluene	5.0	< 1.0	< 1.0	< 1.0
Xylenes	< 1.0	< 1.0	< 1.0	< 1.0

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APPENDIX 4

PROGRAM FOR ADDITIONAL INVESTIGATION, SITE ASSESSMENT, AND REMEDIAL PROGRAM DEVELOPMENT

September 7, 1983
and October 27, 1983 Letter

Betz · Converse · Murdoch · Inc.

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POCONO SUMMIT HAZARDOUS WASTE SITE

TOBYHANNA TOWNSHIP, PENNSYLVANIA

REVIEW OF AVAILABLE INFORMATION AND PROGRAM

FOR

ADDITIONAL INVESTIGATION, SITE ASSESSMENT, AND REMEDIAL PROGRAM DEVELOPMENT

PREPARED FOR

LANDMARK INTERNATIONAL, LTD.
POCONO SUMMIT, PENNSYLVANIA

SUBMITTED TO:

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
SOLID WASTE DIVISION
WILKES-BARRE, PENNSYLVANIA

SEPTEMBER 7, 1983

BCM EASTERN INC.
ONE PLYMOUTH MEETING MALL
PLYMOUTH MEETING, PENNSYLVANIA 19462

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1.0 SUMMARY

The presence of several buried, crushed 55-gallon drums have been confirmed at a 2.5 acre site in Pocono Summit, Tobyhanna Township, Pennsylvania.

To date, magnetometer and ground penetrating radar surveys, soil excavation, shallow boring programs, and laboratory analyses have revealed that less than 5 percent of the site contains buried drums and that concentrations of organic compounds are present in the zones where the drums are buried. No groundwater monitoring wells have been installed onsite but local wells both upgradient and downgradient (presumed) from the site have low levels of volatile organic compounds. Groundwater flow is anticipated to be to the southeast.

A program to further assess monitor soil contamination is proposed. The end product will be a program to remove and properly dispose of contaminated debris and soil and to assess the significance of the site on the local environment.

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2.0 INTRODUCTION

2.1 BACKGROUND

The Pocono Summit hazardous waste site is a 2.5-acre, grass covered, flat, approximately square-shaped site located in the Pocono Summit portion of Tobyhanna Township, Monroe County, Pennsylvania. More specifically, the site is approximately 1,000 feet east of the intersection of Routes 314 and 940 in the easternmost portion of the Township.

During the mid-1970s as many as six hundred 55-gallon drums of unknown contents were stored on the site. In 1976, after the site was purchased by the current owner, LandMark International, Ltd. (LandMark), the previous owners arranged for and completed the removal of the drums. In early 1983, it was brought to the attention of the Pennsylvania Department of Environmental Resources (PADER) that some drums may have been buried on-site. Initiating its investigation in April 1983, the PADER in cooperation with the United States Protection Agency (US EPA) launched a site investigation which included: magnetometer and ground penetrating radar surveys, soil boring and trenching, laboratory analyses of water samples from nearby private water supply wells, priority pollutant analyses of soil samples, and organic compound scans and analyses of the contents of several "lab packs" found in a corner of the site. LandMark has hired BCM Eastern Inc. (BCM) to prepare a program to complete the investigation initiated by the PADER and develop and help implement any needed remedial activities.

2.2 OBJECTIVES

The purposes of this report are to:

1. Assess the available information regarding the wastes and hydrogeologic conditions in and around the Pocono Summit site.

2. Outline a program to complete the site investigation and assessment in order to provide a satisfactory resolution of the problem by concluding that the site does not pose an environmental hazard or by providing for necessary remedial measures. The program for completing the site investigation and assessment has been developed based on the following objectives:

   a. Determine the quantity of soil and residual waste material and containers requiring excavation and on and/or off site treatment.

   c. Prepare a report documenting procedures and presenting the findings of the soils investigations and providing conclusions and recommendations for remedial activities.

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3.0 REVIEW OF AVAILABLE INFORMATION

3.1 INVESTIGATIONS COMPLETED

3.1.1 Magnetometer and Ground Penetrating Radar Surveys

Under the auspices of the PADER, a magnetic survey using a GeoMetrics Model G816 Proton Precision Magnetometer was conducted on April 26, 1983. Northeast-southwest trending rows were established at 20-foot intervals and measurements were made along each row at 10-foot intervals; 556 measurements were made. The results, which are summarized and graphically displayed in a April 28, 1983 memorandum to H.W. Heisey of the Office of the Attorney General (PA) from R.C. Smith, II of the Bureau of Topographic and Geologic Survey (PADER), indicate the majority of the site (95%+) contains no magnetic anomalies possibly indicative of buried drums or other metal objects. Two anolomies (Figure 1), indicated as the northeast edge anomaly and (A) southeast edge anomaly, (B) suggested the likely presence of buried metallic objects. Two other anomalies, referred to as the south corner "anomaly" (C) and southwest edge "anomaly" (D) were considered possible, but not very likely, areas of buried metallic material. Importantly, no linear anomalies were found in the central area, where an informant had reportedly stated that a drum-containing trench was located. A ground penetrating radar survey (a report on which has not yet been provided to BCM) reportedly confirmed the magnetic survey's findings.

3.1.2 Soil Trenches and Borings

Representatives of the PADER and US EPA completed trenching and shallow boring operations in April 1983 in the areas of the northeast edge and southeast edge anomolies. The rusted remains of several crushed 55-gallon drums were found in shallow trenches excavated at the northeast edge anomaly and a very small number of crushed drums were found at the southeast edge anomaly. (Excavated crushed drums were collected in a dumpster and later manifested and removed from the site to a secure facility by a licensed waste hauler.) No intact drums, liquid pools or solid masses of chemical materials were found. Shallow soil borings (1 to 2 feet) were made and samples were retained for analysis. Results are described in Section 3.1.4.

3.1.3 Special Container Investigation

Approximately 125 small containers resembling "lab packs" were found in a packed drum resting on the surface near the south corner of the site. Laboratory analyses, conducted subsequent to the very careful retrieval of the containers by a special field team, reportedly revealed that the containers contained no hazardous materials.

3.1.4 Laboratory Analyses of Site Soil Sample and Local Groundwater

Soil samples collected by representatives of the US EPA and PADER were analyzed for heavy metals and organics by US EPA laboratories. The analytical results are presented in a May 31, 1983 memorandum to Mike Zickler (US EPA) from Daniel K. Donnelly (US EPA). A summary and assessment of the analytical results is provided in the following sections.

Soils

Soil samples from 12 locations on the site were analyzed by the US EPA for PCBs and pesticides by electron capture detection chromatography. Base-neutral and acid extractable priority pollutant compounds were analyzed by gas chromatography/mass spectrometry. In addition non-priority pollutant peaks in the base-neutral and acid extractable fractions were identified where possible. These shallow soil samples were not analyzed for volatile compounds.

No PCBs or pesticides were detected by electron capture chromatography. Trace quantities were suspected at several sites from the GC/MS analyes.

The major priority pollutants present in the base-neutral fractions were the phthalates. Several different compounds were identified and almost all sites and the reagent blank water contained detectable concentrations of these compounds.

From the acid extractable fraction, phenol was present at most sampling locations. No acid extractables were present in the reagent blank.

At most of the sites a number of non-priority pollutant organic compounds were found. These consisted of aromatic and non-aromatic compounds plus bromine containing aromatics.

The bromine-containing aromatics (mostly identified as bromodimethyl compounds or bromoxylenes) are not priority pollutants but would most probably have a toxicity on the order of dichlorobenzenes which are priority pollutants. The bromoxylenes would not be volatile (boiling point about 205°C) and are liquids at room temperature. The solubility in water of these compounds is low and they should be fairly strongly adsorbed onto soil particles.

There was no indication of unidentified peaks in the reagent blank on the soil extracts. From the large number of compounds identified in the soil extracts, it is probable that a number of compounds could not be identified. For the non-priority compounds, the identity assigned by the computer data search must be considered as tentative.

EP Toxicity analyses were run for metals, cyanides, and phenol. Concentrations of phenols and lead were detected at most locations at the site, but not at levels which would be considered as hazardous.

Water/Well Samples

Water from a pit on the abandoned disposal site was analyzed. Lead, alumium, manganese, zinc, cadmium, cyanide, and phenols were present, but not at levels which would be considered hazardous to human health.

Wells in the area were analyzed for metals, phenols, dibromoxylene, and several volatile chlorinated hydrocarbons. Only in one case, the M&G Convoy well, was the well located downgradient from the disposal sites. Many of the wells contained small but detectable levels of trichloroethene (TCE), 1,1,1-Trichloroethane and dichloroethanes. Levels of up to 10 ug/l were detected for TCE downgradient of the M&G site, but levels greater than this were detected upgradient (20 ug/l at Summit Tool).

Metals, phenols, and dibromoxylene were not detected in any well waters. Because of the significant concentrations of phenol at the disposal site and the very high solubility of phenol in water (about 100 grams per liter water), it would be expected that phenol would be detectable at the M&G Convoy site if the downgradient groundwaters were contaminated to any significant extent.

3.2 SITE AND LOCAL HYDROGEOLOGY

3.2.1 Soils

The soils at the Pocono Summit site have been mapped by the Soil Conservation Service as Lackawanna extremely stony loam forming from glacial till. These soils are characterized as well drained with slow permeability rates. The soil's most important characteristic related to the presence of the waste materials at the site is the presence of a fragip in the lower part of the subsoil. The fragipan, normally occupying the zone 20 to 50 inches below the surface, has a brittle consistency and is low in porosity due to clay films and silt occupying the void spaces. The low porosity results in a low permeability ranging between 0.06 and 0.2 inches per hour. This low porosity and permeability and fine grained character of the soil matrix tends to impede the vertical movement of inorganic or organic contaminants to groundwater. A seasonal shallow perched water table will typically be created by the low permeability fragipan. Depth to bedrock is typically in excess of 20 feet.

3.2.2 Geology

The soil is underlain by unweathered glacial till identified as the Wood fordian Ground Morraine (PA Geol. Survey Atlas 204 ed., 1977). The till is composed of an unsorted and non-stratified mixture of boulders, cobbles, pebbles, sand, silt and clay. The percentage of each of these constituents can vary considerably over a short distance. Observation of an old excavation 1,500 feet south of the site revealed the presence of a large cobble fraction and a clay lens of unknown thickness.

The bedrock beneath the site has been mapped as either the Poplar Gap or Packertown Members of the Catskill Formation. Groundwater movement occurs along bedding planes and fractures. The Poplar Gap Member is an important water source in Monroe County. It can be presumed that the Packertown, which is much less extensive, also yields good quantities of water.

3.2.3 Groundwater Depth and Flow Direction

No borings to establish depth to the water table have been completed on-site. The PADER reports that the static water level at the Summit Tool well, situated approximately 400 feet north of the center of the site, is 36 feet below the surface. Based on this information and the topographic position of the site, it is anticipated that the water table is approximately 25 to 35 feet below the surface of the site and is above the till-bedrock interface. Unconfined aquifer conditions are also presumed.

A 2-dimensional representation of the water table surface in an unconfined aquifer is typically a subdued replica of the surface topography. Although the 2.5 acre site is nearly flat, the topography of the general area dips to the southeast. This dip steepens immediately south of the site. Under these circumstances, it can be presumed that groundwater flow direction is normal to the surface contour and is therefore to the southeast.

No active private wells are directly in the anticipated path of groundwater leaving the site.

3.3 VEGETATION

The 2.5-acre site was cleared of trees and native shrubs several years ago and is now covered with grasses and related annual cover. The adjacent land is covered by deciduous trees and shrubs. No signs of vegetative stress were observed in the shrubs or mixed deciduous trees adjacent to the two areas where crushed buried drums were found.

3.4 SUMMARY OF PRELIMINARY FINDINGS

1. Magnetometer and ground penetrating radar surveys identified two small areas representing less than 5% of the Pocono Summit site as having anomolies possibly indicating the presence of buried metal objects. Preliminary excavation at these two areas revealed the presence of a small number of crushed, rusted 55-gallon drums.

2. Analyses of soil samples obtained from the area of the crushed drums revealed the presence of several organic compounds.

3. Analyses of samples from several nearby wells showed that the heavy metals concentrations were well below drinking water standards. Concentrations of TCE, and 1,1,1 Trichloroethane and dichloroethanes were found on the order of 10 to 30 ug/l in nearby wells, all but one of which are probably upgradient and, therefore, outside of the influence of the site. No phenols or highly soluble compounds present in the soil samples at the site were found in the downgradient supply well.

4. No air quality data were available to BCM, but it is understood that background readings made at the site as part of the PADER and US EPA investigations did not reveal the presence of airborne organic contaminants.

5. The site is underlain by a deep soil, containing a fragipan zone overlying a glacial till of mixed composition. Depth to bedrock is probably 30 to 40 feet.

3.5 PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

1. A modest quantity of crushed drums and soil contaminated with organic compounds is present at the Pocono Summit site. Some additional soil testing to determine the depth of affected soil should be completed prior to determining the extent of soil which may warrant excavation for onsite and/or offsite treatment or disposal.

2. There is no evidence that local groundwater has been affected by the site. The organic contaminants found in the nearby wells have not been detected in the soil samples. Deeper soil samples should be analyzed to assess whether contaminants have migrated deeper than the 2-foot depth currently known.

4.0 ADDITIONAL INVESTIGATION

4.1 INTRODUCTION

The investigation completed to date at the Pocono Summit site by the PADER and US EPA has been summarized in Section 3.0. As stated in Section 2.2 and 3.4, additional investigation must be conducted to more adequately assess the conditions of the soil beneath the site. In accordance with the need for additional work and the program objectives stated in Section 2.2, the two-phased work program described below has been developed.

4.2 RESIDUAL WASTES AND CONTAMINATED SOILS

4.2.1 Boring/Sampling Program

Using soil augering equipment, borings will be made in the two areas known to contain buried crushed drums. Previous sampling was limited to the upper 2 feet of soil. Five borings are anticipated in the southeast edge area and one boring is anticipated in the southwest edge area. Samples will be collected at 2-foot intervals to a depth of 15 feet. One boring each will be made at the two other locations identified in the magnetometer survey as being possible locations for buried drums. Soil boring specifications are provided in Attachment 1.

4.2.2 Analytical Program

The objective of the analytical program is to assess the lateral and vertical distribution of organic contaminants in the soil. Due to their high concentrations and distinctly different mobility, two parameters - bromodimethylbenzene and phenol - will be used as indicators. Analyses will be made of the first sample from each boring below the bottom of the zone containing the rusted crushed drum pieces. Should significant concentrations (greater than 5 mg/kg) of either of these compounds be found, then the next lower sample will be analyzed. Analyses will continue to samples from greater depths as necessary. In addition to these analyses representative samples obtained from below the crushed drums which will be analyzed for volatile organics. Should concentrations in excess of 1 mg/kg for purgable halocarbons and/or 5 mg/kg for purgable aromatics be detected, additional samples will be analyzed.

4.2.3 Determine Appropriate Remedial Action

The information available from the PADER and US EPA investigations and from the program described above will be used to assess the quantity of soil which may have to be excavated and removed from the site. An implementation program will be prepared as part of the report on findings.

5.0 SAFETY PROGRAM

The following levels of personal protection will be maintained during the field investigation:

Soil Boring: Level 3 protection will be maintained with constant monitoring by an OVA. Level 2 breathing apparatus will be available.

Routine Site Work: Level 4 will be maintained unless field operations result in organic vapors requiring a higher level of protection.

Excerpts from BCM's Safety Manual for Hazardous Waste Site Investigations are presented in Attachment 2.

ATTACHMENT 1

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SOIL BORING SPECIFICATIONS

Several soil borings are proposed to assess the degree of possible contamination in the subsurface environment.

The borings will be accomplished as follows:

1. Use 10-inch OD by 6-1/4 inch ID hollow stem augers to advance the boring.

2. Sample at 2-foot intervals using a 2" OD by 2 foot long split spoon sampler driven by a 140 pound hammer, and a 30-inch drop. Record blow counts for each 6 inches driven. Begin sampling at the surface and sample as follows: 0 - 2 feet, 4 - 6 feet, 8 - 10 feet, etc.

3. Steam clean the split spoon between samples

4. Backfill the boring following completion with a mixture of bentonite and drill cuttings.

It is anticipated that soil borings will require heavy duty drilling machinery, similar to a CME 75 or Mobile B-61, in order to penetrate the glacial materials beneath the site. In addition, borings may be relocated if large boulders prevent advancement of the hollow stem augers. Drilling fluids will not be introduced into soil borings. The drill rig and drilling tools will be steam cleaned prior to entering the site, between boring and prior to leaving the site.

The level of protection required will be determined by BCM. It will be the contractors responsibility to provide adequately trained and equipped personnel to meet the level of protection required.

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ATTACHMENT 2

EXCERPTS FROM BCM SAFETY MANUAL
FOR HAZARDOUS WASTE SITE INVESTIGATIONS

7.0 SITE ENTRY - LEVELS OF PERSONNEL PROTECTION

7.1 INTRODUCTION

It is important that PPE and safety requirements be appropriate to protect employees against the potential or known hazards of an investigation. Protective equipment should be selected based on the type(s), concentration(s), possibilities, and routes of personnel exposure from substances at a site. In situations where the type of materials and possibilities of contact are unknown or the hazards are not clearly identifiable, a more subjective determination must be made of the PPE required for initial safety.

The appropriate level of protection shall be determined prior to the initial entry onsite, based on best available information. Subsequent information may suggest changes in the original level selected.

The following levels of protection are rules to be followed so that the selection of PPE is conducted on a consistent and uniform basis.

7.2 LEVELS OF PROTECTION

7.2.1 Level 1

Level 1 protection should be worn when the highest available level of respiratory, skin, and eye protection is needed. While Level 1 provides the maximum available protection, it does not protect against all possible airborne or splash hazards. For example, suit material may be rapidly permeable to certain chemicals in high air concentrations or heavy splashes.

7.2.2 Level 2

Level 2 protection should be selected when the highest level of respiratory protection is needed, but when exposure to the small unprotected areas of the body (i.e., neck and back of head) is unlikely, or where concentrations are known to be within acceptable exposure standards.

Level 2 protection is the minimum level recommended on initial entries until the hazards have been further identified and defined by monitoring, sampling, and other reliable methods of analysis, and until PPE corresponding with those findings is utilized.

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7.2.3 Level 3

Level 3 protection should be selected when the type(s) and concentration(s) of respirable material are known, have adequate warning properties, or are reasonably assumed to be not greater than the protection factors associated with air-purifying respirators; and exposure to the few unprotected areas of the body (i.e., neck and back of head) is unlikely to cause harm. Continuous monitoring of site and/or individuals should be established.

7.2.4 Level 4

Level 4 is the basic work uniform and should be worn for all site operations. Level 4 protection should only be selected when sites are positively identified as having no toxic hazards.

7.3 EQUIPMENT AND SELECTION CRITERIA

7.3.1 Level 1

1. Personal Protection Equipment

   a. Positive-pressure SCBA (MSHA/NIOSH approved) operated in the positive-pressure mode

   b. Totally encapsulating suit (boots and gloves attached)

   c. Boots - Chemical-protective; steel toed. Depending on suit construction, worn over suit boots

   d. Gloves - Outer, chemical-resistant. Depending on suit construction, worn over suit gloves. May be replaced with tight-fitting, chemical-resistant gloves worn inside suit gloves

   e. Underwear - cotton

   f. Hard hat* (under suit)

   g. Disposable protective suit, gloves, and boots (worn under or over encapsulating suit)*

   h. Coveralls* (under suit)

   i. 2-way radio communications

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* Optional

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2. Criteria for Use

a. When the type(s) and concentration(s) of toxic substances are known and require the highest level of combined protection to the respiratory tract, skin, and eyes. These conditions would be:

(1) Atmospheres which are "immediately dangerous to life and health" (IDHL). IDHLs can be found in the NIOSH/OSHA's Pocket Guide to Chemical Hazards and/or other references.

(2) Known atmospheres or potential situations that would affect the skin or eyes, or could be absorbed into the body through these surfaces in toxic quantities:

(a) Potential situations are those where vapors may be generated or splashing occurs through site activities.

(b) Standard reference books should be consulted to obtain concentrations hazardous to skin, eyes, or mucous membranes.

(3) Oxygen-deficient atmospheres with above conditions

b. At sites where the type(s) and/or potential concentration(s) of toxic substances are unknown

(1) Unless circumstances strongly indicate otherwise, the site should be presumed to present hazards to the respiratory system, skin, and eyes. Level 1 protection would provide the highest level of protection for the initial entry team. Such circumstances might be:

(a) Environmental measurements contiguous to the site

(b) Reliable, accurate historical data

(c) Open, unconfined areas

(d) Minimal probability of vapor presence or splashing with cutaneous-effecting substances

(2) Enclosed areas such as buildings, railroad cars, ships holds, etc.

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c. Total vapor readings indicate 500 ppm to 1,000 ppm on instruments such as the photoionizer or organic vapor analyzer

7.3.2 Level 2

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1. Personal Protective Equipment

   a. Positive-pressure SCBA (MSHA/NIOSH approved), operated in the positive-pressure mode

   b. Hooded, two-piece chemical resistant suit

   c. Gloves - Outer, chemical protective

   d. Boots - Outer (chemical protective, heavy rubber disposables)

   e. 2-way radio communications

   f. Hard hat*

   g. Face shield*

2. Criteria for use

   a. When the type(s) and concentration(s) of hazardous substances are known and require the highest degree of respiratory protection, but a lower level of skin protection:

      (1) Atmospheres which are "immediately dangerous to life and health" (IDLH). Type(s) and concentration(s) of vapors in air do not present a hazard to the small, unprotected areas of the body

      (2) Atmospheres with concentrations of known substances greater than protection factors associated with full-face, air-purifying respirators with appropriate cartridges

      (3) Atmospheres with less than 19.5 percent oxygen

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* Optional

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b. A determination is made that potential exposure to the body parts not protected by a fully encapsulating suit (primarily neck, ears, etc.) is highly unlikely:

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(1) Known absence of cutaneous or percutaneous hazards

(2) Activities performed preclude splashing of individuals

c. Total vapor level ranges from 5 - 500 ppm on instruments such as the photoionizer or organic vapor analyzer and does not contain high enough levels of toxic substances to affect skin or eyes

d. Level 2 protection is recommended as the lowest level of protection for initial entries until the hazards have been further identified and defined by monitoring, sampling, and other reliable methods of analysis, and until personal protection equipment commensurate with these findings is utilized

7.3.3 Level 3

1. Personal Protective Equipment

a. Full-face, air-purifying respirator - (MSHA/NIOSH approved)

b. Chemical resistant clothing

c. Overalls and long-sleeved jacket or coveralls; hooded 2-piece chemical splash suit (when applicable - hooded disposable coveralls)*

d. Gloves - Outer (chemical-protective)

e. Escape mask

f. Hard hat* (face shield, optional)

g. Boots - Outer (chemical-protective heavy rubber disposable)

h. Boots - Inner (chemical-protective, steel toe)

i. 2-way radio communications

---

*Optional

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2. Criteria for Use

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a. Site known to contain potential hazards not to exceed:

(1) Air concentrations of material not requiring a protection factor greater than that afforded by a full-face mask (normally considered to be 100). Material must have warning properties.

(2) Body exposure to unprotected areas (face, neck, etc.) nonexistent or less than any amount that will cause harm

(3) Well-documented, reliable history of site and patterns of prior entry

(4) No evidence of acute or chronic effects to exposed personnel

b. Total vapor reading between 0 and 5 ppm above background on instruments such as the photoionizer and portable GC

c. Continuous air or personnel monitoring should occur while wearing Level 3 protection

7.3.4 Level 4

1. Personal Protective Equipment

a. Coveralls - fire-resistant

b. Boots/shoes - safety or chemical-resistant steel-toed boots

c. Boots - Outer (chemical-protective heavy rubber disposable)

d. Escape mask

e. Safety glasses or safety goggles

f. Hard hat* (face shield optional)

g. Gloves*

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* Optional

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2. Criteria for use

a. No indication of airborne health hazards present

b. No gross indications above background on the photoionizer and/or organic vapor analyzer

c. Continuous air or personnel monitoring should occur while wearing Level 4 protection

7.4 CRITERIA FOR ESTABLISHING LEVELS OF PROTECTION IN UNKNOWN ENVIRONMENTS

In response to an incident where the type(s) and concentration(s) of substances injurious to human health in the ambient atmosphere are unknown, it must first be determined whether it is necessary to have personnel enter the site or proximity of the potential source of exposure. A requirement for onsite operations necessitates that personnel initially enter the site to characterize and define the hazardous environment that potentially exists.

The lack of knowledge concerning the toxic atmosphere precludes the use of a decision logic for selecting respiratory protection equipment based on evaluating concentrations of known toxicants against safety factors associated with various types of personal protective equipment. Until qualitative and quantitative information is available for assessing the ambient atmosphere at a site, levels of protection based on gross measurements from portable instruments for organic vapor analysis (portable GC, organic vapor analyzer, etc.) may have to be used. The following pages present general criteria and information for three different organic vapor ranges.

If carcinogens or other highly toxic materials are suspected to be present, levels of protection should be determined on a case-by-case basis.

7.4.1 Zone 1 - Total Vapor Readings: 500 ppm to 1,000 ppm

1. Definition

The section of the site which has the highest inhalation exposure potential and/or contains suspected high probability to skin contact with cutaneous or percautaneous effecting chemicals.

2. Protection Level

Since the area requires maximum respiratory, skin, and eye protection, this area requires Level 1 PPE.

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3. Monitoring Criteria

Note wind direction and atmospheric conditions before taking environmental background readings. The zone's total vapor concentrations at breathing levels vary above background from 500 ppm to 1,000 ppm.

The entry team should not routinely enter an area containing total vapor concentrations over 1,000 ppm. Although the protective equipment required for this area is sufficient for environments with total vapor concentrations greater than 1,000 ppm, the entry team should evaluate the need for further entry on a case-by-case basis.

7.4.2 Zone 2 - Total Vapor Readings: 5 ppm to 500 ppm

1. Definition

The section of the site which has the next highest respiratory hazard and does not have a high probability of skin contact with cutaneous or percutaneous chemicals.

2. Protection Level

Since the area requires maximum respiratory protection and the next lower level of skin and eye protection, this area requires Level 2 personal protection.

3. Monitoring Criteria

Note wind direction and atmospheric condition before taking environmental background readings. The zone's total vapor concentrations at breathing levels vary above background from 5 ppm to 500 ppm.

Level 2 is for those areas where the potential exposure to the small unprotected areas of the body is not likely to be harmful upon skin contact.

7.4.3 Zone 3 - Total Vapor Readings: Background to 5 ppm

1. Definition

The section of the site where exposure potential is assumed relatively unlikely, but where, however, low levels of respiratory exposure are possible.

2. Protection Level

Since the exposure potential, concentration, and/or route(s) of contamination are assumed not to be greater than the protection factor associated with a full-face air-purifying respiratory, this area requires Level 3 personal protection.

3. Monitoring Criteria

Note wind direction and atmospheric condition before taking environmental background readings. The zone's total vapor concentrations at breathing levels vary above background to 5 ppm.

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APPENDIX 6

SAFETY PLAN - GENERAL

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HEALTH AND SAFETY PLAN

FOR

POCONO SUMMIT HAZARDOUS WASTE SITE

SEPTEMBER 1984

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1.0 INTRODUCTION

Landmark International, Ltd (Landmark) has retained BCM Eastern Inc. (BCM) to supervise a soil cleanup of the Pocono Summit Hazardous Waste Site in Tobyhanna Township, Pennsylvania. This site-specific health and safety plan is designed to provide the necessary guidance to prevent exposure of the field crew and the surrounding community to high concentrations of organic vapors and contaminated soil. This health and safety plan summarizes BCM's site safety procedures.

Potential contaminants will likely consist of volatile halocarbons and aromatic compounds.

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2.0 RESPONSIBILITIES

2.1 PROJECT MANAGER

The project manager will be responsible for assignment of qualified BCM field personnel and coordinating the work with Landmark personnel.

2.2 PROJECT SUPERVISOR

The project supervisor assigned to the site will be responsible for:

1. Assuring that appropriate personnel protective equipment is available and properly used by BCM and Landmark personnel.

2. Assuring that personnel are aware of the provisions of this plan, and are instructed in the work practices, safety, and emergency procedures.

2.3 PROJECT SAFETY SPECIALIST

The safety specialist is responsible for the implementation of the site safety plan and assuring compliance with BCM's company safety manual. At the Landmark site, the safety specialist will:

1. Conduct site monitoring of personnel hazards to determine the degree of hazard and establish the proper level of protection required.

2. Evaluate weather and chemical hazard information and recommend any necessary modifications to the excavation and treatment plan and personnel protection levels to assure the safety and health of all project personnel.

3. Monitor the safety performance of all project personnel to ensure that proper safety and health procedures are employed.

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3.0 POTENTIAL ZONES OF CONTAMINATION

It will be necessary to establish potential contamination zones to prevent unauthorized personnel from entering the area. Two zones will be required for adequate segregation of "safe" and "contaminated" areas.

3.1 INNER ZONE

The inner zone will be established by the safety specialist onsite. The inner zone will be cordoned off by plastic tape supported by cones or stakes. The area should be large enough for safe movement of essential personnel and is intended to contain excavation and treatment equipment and the area that may be exposed to contaminated soil. Only personnel essential to the completion of the project will be permitted to enter the inner zone. All personnel in the inner zone will be required to wear the protective gear established by the safety specialist, as outlined in Section 4.0.

3.2 OUTER ZONE

The outer zone also will be cordoned off by plastic tape. It will serve as a buffer between the inner zone and the clean zone, and will be a staging area for project personnel. A first-stage decontamination station will be set up between the inner and outer zones. The outer zone will store replacement safety equipment that may be necessary during each day's operation. A second-stage decontamination station will be set up between the outer and clean zone. No contaminated material shall leave the outer zone without proper second-stage decontamination, as outlined in Section 5.0.

4.0 LEVELS OF PROTECTION

The level of respiratory protection will be determined by the safety specialist who will monitor the air with an HNU photoionization detector (HNU). The primary hazard to project personnel may be from inhalation of organic vapors and direct skin contact with, or ingestion of, contaminated soil or water. The minimum protection required for personnel in the inner zone will be:

1. Gloves

   Nitrile (green) for most work; neoprene (red) as a heavy work glove over the light nitrile glove.

2. Disposal Splash Suit

   White Tyvek coveralls will be worn as a minimum requirement. Polycoated (yellow) Tyvek will be available if its use is determined necessary by the safety specialist from onsite measurements and observations of the soil.

3. Head Gear

   Hard hats are required within the inner zone.

4. Eye Protection

   Safety glasses with side shields or goggles will be worn in the inner zone whenever respiratory protection is not required.

5. Boots

   Rubber overboots will be worn within the inner zone.

6. Respiratory Protection

   The respiratory protective devices used at this site will fall into two categories: airline respirators and air purifying respirators. The level of respiratory protection to be used will be based upon the use of the HNU detector. The following guidelines will be used:

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a. Airline respirators are to serve as backup protection in the event that breathing zone concentrations of organic vapors exceed 100 parts per million (ppm). The safety specialist should also monitor the downwind concentration of the vapors to determine if air stripping should be discontinued to prevent high vapor concentrations from excaping into the surrounding area.

b. Full-face air-purifying respirators with organic vapor cartridges (black) with dust filters attached will be used when the organic vapor level in the breathing zone is between background and 100 ppm.

c. If the organic vapor concentration is not above the established background, no device is necessary, but a fullface air-purifying respirator should be carried, ready for use.

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5.0 DECONTAMINATION

5.1 STAGE 1

1. Remove gross quantities of mud and dirt from overboots with scrapers provided.

2. Wash hands and face with soap and water.

3. If respirator is grossly contaminated or work is completed for the day, dispose of the cartridges, and clean and disinfect the respirator using normal procedure. If respirator is not contaminated and same day re-entry is planned, wipe down the respirator with equipment wipes provided. Place the respirator in a clean bag and proceed to clean area.

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6.0 EMERGENCY CONTINGENCY PLAN

If an incident occurs necessitating a response to an emergency, all personnel will assemble at the decontamination station for instruction. A list of telephone numbers and locations of emergency facilities will be kept at the decontamination stations.

If someone is injured, personnel will assemble at the decontamination site. If any of the injured personnel is immobile, one or more persons should remain to provide any necessary first aid. If medical help is needed, one person should be assigned to summon the appropriate assistance. The extent of decontamination of any injured personnel and measures required for his aid is a judgment that must be made on a case-by-case basis, which is the responsibility of the project supervisor.

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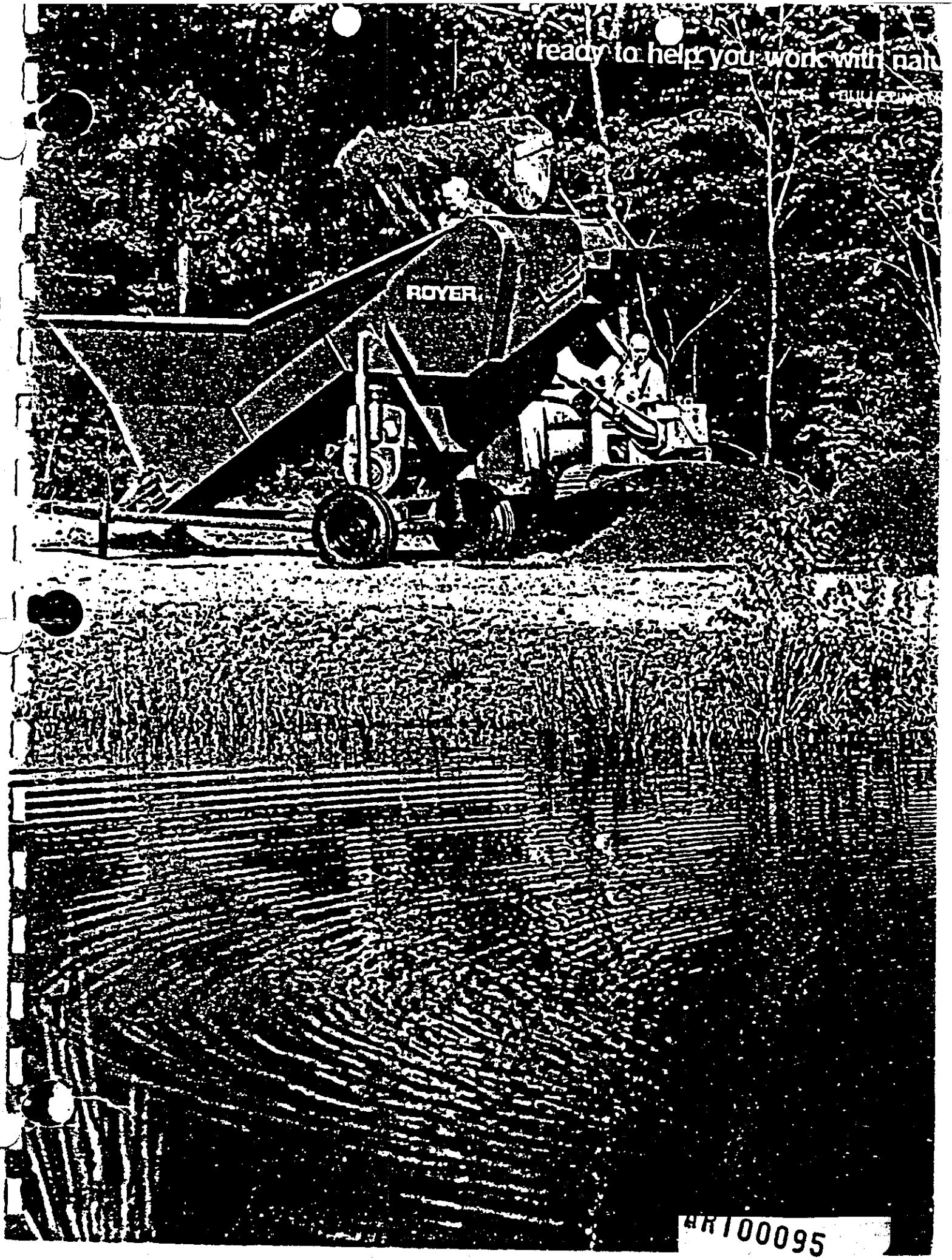
APPENDIX 7

TREATMENT EQUIPMENT SPECIFICATIONS



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Royer Shredder-Mixers

Meet the machines expressly made for processing basic earth materials. Like top soils, compost and peat.

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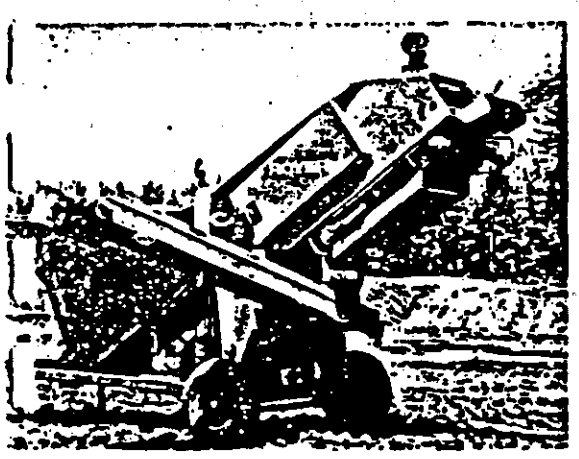
Let's say that the processing of top soil, leaf mold humus, peat or a like material is central to your operation. Then, the choosing of equipment to do the processing can prove central to your success. So, *it pays to be thorough in making* selections.

A lot of different types of equipment are being sold and used for processing earth materials—equipment with some big differences in efficiencies and costs. For example, there are many single-function machines such as hammermills, concrete mixers, and screens that are often adapted or combined into *a makeshift system. But only a few* multi-function machines are being marketed specifically and solely for processing earth materials.

Of these, only one, the Royer Shredder-Mixer, is actually designed to do the entire processing job. In operation, this machine performs as a complete, 4-step processing plant that

- provides two-stage mixing of material,
- breaks down and shreds lumps and oversize material into uniform-size particles,
- aerates material before and after discharge,
- automatically and continuously separates non-shreddable material from the end-product.

It's available in five models to *meet peak capacity requirements* ranging from 15 to 125 cubic yards per hour: Models 120, 182, 262, 300 and 365.



The 300 — an all-hydraulic, high-capacity mobile plant

The Model 300, below left, is the newest high-capacity shredder-mixer in the Royer line. It's equipped with a power system that combines a 58 HP diesel engine with the smoothness of hydraulics to deliver high performance.

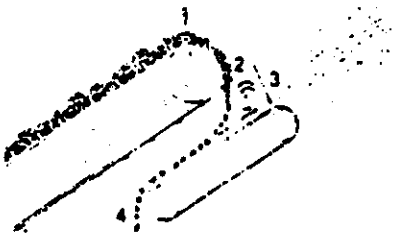
The 300's all-hydraulic operation permits the operator to control the speed of the conveyor as it feeds material to the shredding belt. This variable-speed capability of the 300's feed conveyor means that the machine can perform at its maximum efficiency with *different types and conditions of* materials.

The 300, which will process up to 75 cubic yards of material an hour, is designed for users who require less capacity than the 125 yard Model 365. Compactly designed, the 300 is easy to trail from site-to-site and to maneuver into position. Its high discharge is ideal for stockpiling, windrowing and *for direct truck loading.*

"Royeration"—a unique 4-step processing action

But, regardless of their size, all Royer Shredder-Mixers work the same way. The key to exceptional efficiency is based on a unique operating principle.

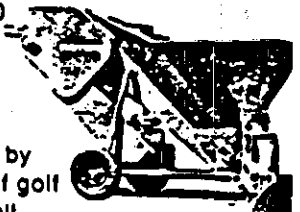
After material is fed into the receiving hopper, it is carried to the top end of a flighted conveyor (1) where it cascades to the shredding belt (2). This endless-type belt moves at high speed to churn and toss the material. Faced with rows of tempered steel shredding cleats, the shredding belt produces a continuous raking action to shred and aerate the load. Only preselected size particles are discharged through the adjustable, variable-sweep fingers (3) while oversizes are forced back for further processing. Non-shreddable material—sticks, stones, metals, glass, etc.—are automatically rejected from the end product and discharged through a trash chute (4). This chute directs the non-shreddables to the base of the machine, well away from the processed material.



The processing action of Royer machines gives them definite ad*vantages over hammermill-type* machines. Hammermills smash and crush glass, cans, metals, rock and other non-shreddables. Royer machines automatically and continuously reject such material and discharge it through a built-in trash chute—as much as 20' away from the fully processed material. Instead of aerating the end product, a hammermill compacts it. Royer *machines thoroughly aerate pro*cessed material in two different stages of operation. Hammermills experience great difficulties when working with moist material. But Royer's double aeration reduces the problems of processing moist material.

The 120—number one with golf course superintendents

Because a Royer Shredder-Mixer can be used to produce high quality, trash-free soil mixes and top-dressings, it is right at home on a golf course.



The Royer 120 *is actually* called the Superintendent because it's the model preferred by men in charge of golf courses. It's small and compact enough to be readily mobile...yet, large enough to process up to 15 cubic yards of material per hour, for extensive turf repairs.

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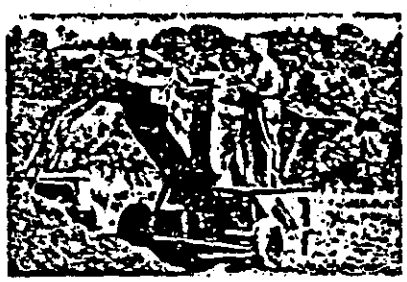
Many golf course Superintendents use the Model 120 to prepare special soil-additive mixes suitable for top-dressing greens and tees. Some Superintendents use the 120 in conjunction with a Royer Powerscreen to prepare superfine top-dressing—down to ¼" particle size. The Powerscreen is designed to receive the direct discharge from a 120—eliminating in-between handling. And the superfine, homogeneous mix prepared by the 120 and screen is ideally suited for distribution with mechanical top-dressing equipment.

Golf course Superintendents aren't the only 120 users. Landscape and grounds maintenance contractors, nurserymen and growers also use the 120. Growers, for example, use the 120 to prepare special media mixes and to feed the mixes directly to Royer Mechanized Container-filling Systems.



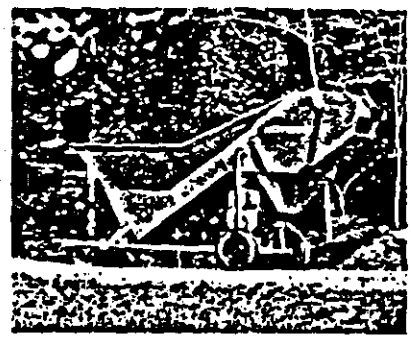
The 25 yards-per-hour 182

The next larger size Royer Shredder-Mixer, the 182 (shown above), combines the same complete processing capability and high mobility with a shredding capacity up to 25 cubic yards per hour. It's a favorite in mushroom country where it's used to prepare special growing mixes. It features a large, 5' square receiving hopper that's just 6' high...low enough for quick, easy loading with small tractor buckets. Yet, its discharge is high enough for direct truck loading.

The mid-size 262—
a commercial operation favorite

In many commercial operations, Royer's mid-size 262 Shredder-Mixer is just right for the job.

This model is compact. Easy to trail at highway speeds. Has a big



2 cubic yard hopper, a capacity to 45 cubic yards an hour and an 8½' high discharge. It's not the biggest machine, but it fits the specs in many operations. And, like all Royer Shredder-Mixers, it's built to stay on the job and withstand punishing, day-in, day-out usage.

The big, smooth,
all-hydraulic 365

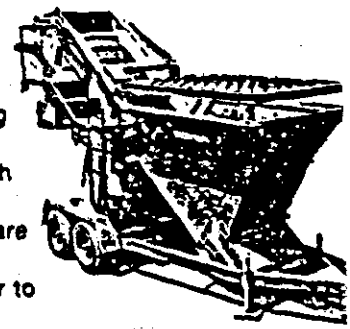
The largest capacity Royer Shredder-Mixer is the all-hydraulic diesel-powered Model 365 (right). This one will process up to 125 cubic yards of material an hour. Like all of the high-output machines described in this literature, the 365 is custom-fabricated by a company with over 50 years of engineering, design and manufacturing expertise.

The all-hydraulic operation of the 365 provides a smooth transmission of power to the feed conveyor, shredding belt, vibrating stone grate and Trash-Away conveyor.

The optional vibrating stone grate improves the overall performance of the high-capacity 365. The vibrating action eliminates material build-up on top of the grate and minimizes the manual labor required to pass material through the 8"-square grate openings. The only manual effort involved is an occasional clearing of oversize material from the top of the all-welded steel grate.

A major advantage of the 365 is the hydraulically-operated feed conveyor. With the speed of the conveyor fully adjustable, the operator can control the flow of material to the shredding belt in accord with the type/condition of material being processed. As a result, the 365 can be run on a continuous basis at its most efficient operating speed.

When it comes to moving the tandem-axle 365 over the highway, there's no problem at all. The 365 is stable, easily trailable and highly manueverable. It's available with an over-the-road package that includes special axles, brakes, lights and signals, plus four truck tires that make it easy to tow at speeds up to the limit. In contrast, competitive shredders of the same capacity are twice as long as the 365 and built with wagon-type frames that are tough to tow...tougher to maneuver.



In the final analysis, the machine that's best for you is the one that comes closest to meeting all of your requirements. It might not be the biggest or the smallest model. Other factors are bound to be involved when selecting. Like compatibility with your loading equipment. Mobility as it relates to your tow vehicles. Perhaps even overall size when you may occasionally work in confining areas. Or discharge height when you want to create large, high stockpiles of material. Meeting your specific requirements is the reason Royer builds shredder-mixers in five different sizes and capacities.

Whatever model you select, you'll get the same high-speed 4-in-1 continuous processing action from the only machines designed to deliver the entire job: Shredding, mixing, aerating and cleaning.

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Operating and construction features

A. All-welded stone grate keeps large rocks, trash from entering hopper. Grates are available in stationary and vibrating designs. (See chart, page 6, for availability.)

B. Lump breakers are "swing-away" cast iron weights that break up lumps...level depth of material flowing to the shredding belt.

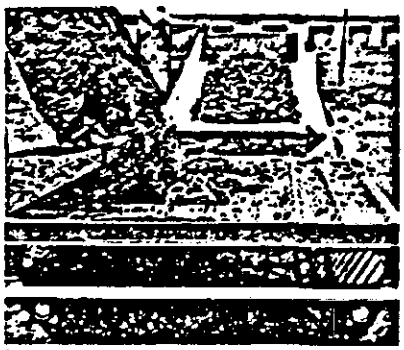
C. Shredding Belt (patented) is faced with rows of tempered steel cleats that provide a continuous raking action to shred and mix material...perform preliminary aeration. Belt replacement is simple, easy, not time consuming. **Trash chute** at bottom of shredding belt receives rejected non-shreddable material...discharges it away from *processed material.*

D. Steel-flighted conveyor belt moves material from hopper to shredding belt at steady, even flow.

E. Trash-Away conveyor receives rejected, non-shreddables from trash chute. Conveyor elevates and discharges trash at 90° angle to processed material...permits direct truck loading, high stockpiling, or windrowing of trash parallel to processed material. (See chart, *page 6, for availability.*)

F. Variable sweep and deflector. Sweep regulates particle size of discharged material—fine to coarse. Manual handle (top left) controls sweep while shredder is in operation. Accessible from the ground on Model 120...from work stations of other models. Adjustable deflector directs flow of processed material. Raised deflector arcs material at 40°, to provide secondary aeration.

G. Work station includes heavy-gage steel platform that serves as observation deck for operator. Receiving hopper platform (not shown) provides additional work station. (See chart, page 6, for availability of receiving hopper work station.)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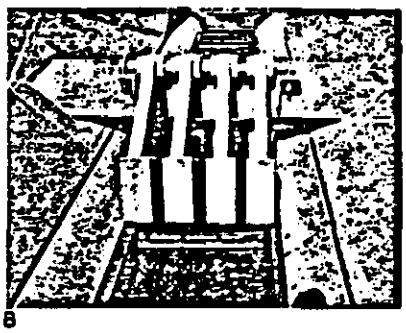
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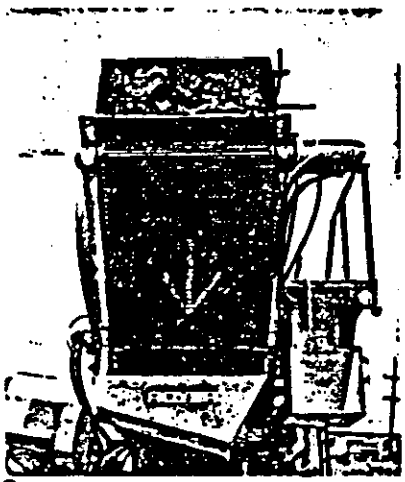
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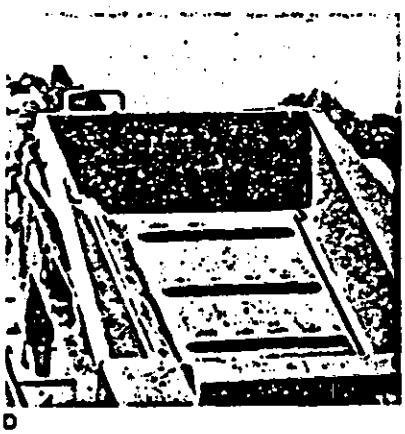
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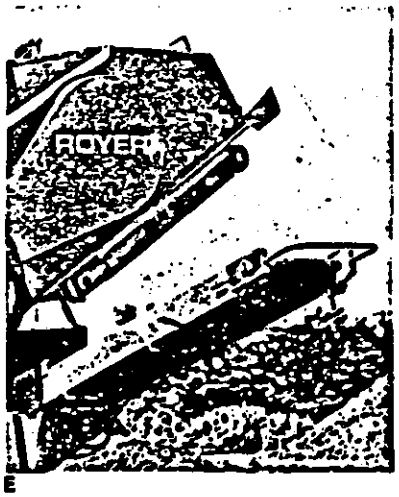

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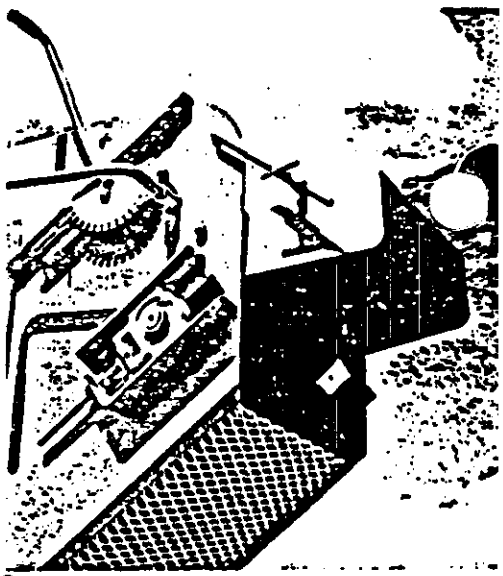
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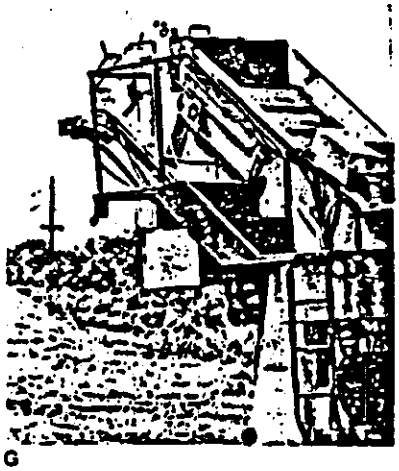
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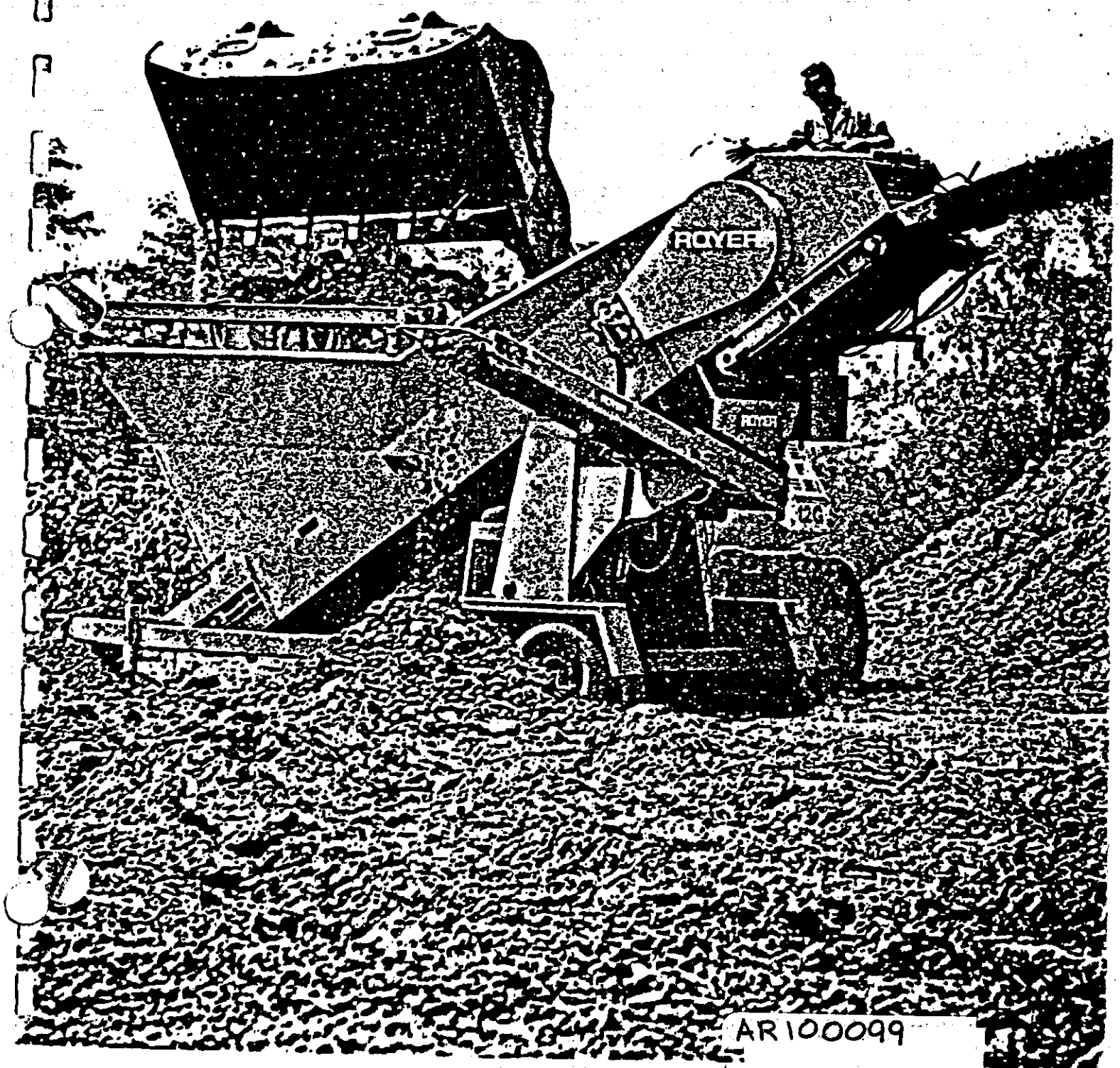
eed conveyor and shredding belt of the 365 are individ- operated by a closed loop hydrostatic hydraulic system. The optional vibrating grate and Trash-Away conveyor are operated by an open loop hydraulic system that also serves as a cooling system for the total hydraulic package.



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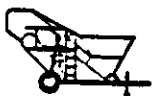
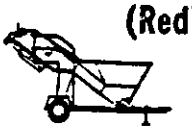
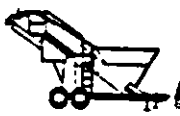
Specifications

MODELS	 120	 182	 262	 300	 365
Input processing rate (maximum to shredding belt)	15 cu. yds./hr. (12m³)	25 cu. yds./hr. (20m³)	45 cu. yds./hr. (35m³)	75 cu. yds./hr. (60m³)	125 cu. yds./hr. (95m³)
Overall dimensions L x W x H	12' x 5'3" x 6'3" (3.65m x 1.6m x 1.9m)	14'8" x 6'2" x 7'4" (4.47m x 1.88m x 2.24m)	17'9" x 6' x 9'4" (5.4m x 2.08m x 2.84m)	20' x 6'6" x 10'6½" (6.1m x 1.98m x 3.21m)	22' x 8' x 12' (6.7m x 2.43m x 3.65m)
Loading height	5' (1.52m)	6' (1.83m)	6'6" (1.98m)	7'1" (2.15m)	7'8" (2.34m)
Discharge height	5'3" (1.6m)	6' (1.83m)	7'6" (2.3m)	8'8" (2.64m)	10'5" (3.17m)
Hopper capacity (level)	.75 cu. yd. (.57m³)	1.4 cu. yds. (1.1m³)	2.34 cu. yds. (1.8m³)	2.34 cu. yds. (1.8m³)	4.4 cu. yds. (3.37m³)
Receiving hopper opening	4' x 4' (1.22m x 1.22m)	5' x 5' (1.52m x 1.52m)	6'6" x 5' (1.98m x 1.52m)	6'6" x 5' (1.98m x 1.52m)	5'6" x 8' (1.67m x 2.43m)
Recommended loader size	½ cu. yd.	1 cu. yd.	1½ cu. yds.	1½ /2 cu. yds.	3 cu. yds.
Feed conveyor width	12" (304mm)	16" (405mm)	20" (506mm)	20" (506mm)	30" (760mm)
Shredding belt width	12" (304mm)	18" (456mm)	26" (658mm)	26" (658mm)	36" (912mm)
Tires	two 4:00x12, 4-ply Implement	two 6:40x15, 6-ply Implement	two 7:60x15, 8-ply Implement	two 7:60 x 15, 8-ply Implement	four 7:60x15, 8-ply Implement
Power plant	23.9 cu. in. 1-cylinder, air-cooled, 4-cycle gas engine with starter (10 HP)	53.9 cu. in. 2-cylinder, air-cooled, 4-cycle gas engine with starter (18 HP)	107.7 cu. in. 4-cylinder, air-cooled, 4-cycle gas engine with starter (25 HP)	154 cu. in. 4-cylinder, 4-cycle diesel engine (58 HP) (gas engine optional)	226 cu. in. 4-cylinder, 4-cycle diesel engine (72 HP)
Weight — (Approx. less options)	1,600 lbs. (725 kg.)	3,000 lbs. (1360 kg.)	4,900 lbs. (2222 kg.)	6,000 lbs. (2700 kg.)	9,200 lbs. (4175 kg.)
Accessories					
Stone grate (Stationary)	Optional	Optional	Optional	Standard	Standard
Stone grate (Vibrating)	Not Available	Not Available	Not Available	Not Available	Optional
Trash-Away conveyor	Not Available	Not Available	Optional 12'L x 16"W	Optional 12'L x 16"W	Optional 12'L x 16"W
Over-the-road package: Electric brakes; directional, stop and clearance lights; axles as needed	Not Available	Optional	Optional	Optional	Optional
Tires for highway travel	Not Available	two 6:70x15, 6-ply Truck	two 7:00x15, 8-ply Truck	two 7:00 x 15 8-ply Truck	four 7:00x15, 8-ply Truck
Hopper platform	Not Available	Not Available	Optional	Optional	Optional
Lump breakers	Standard	Standard	Standard	Optional	Optional

To implement its policy of continuing product improvement, Royer reserves the right to alter designs and specifications without notice.

Literature Available on Other Royer Equipment: Woodsman land clearing machines—Bulletin 6000; Brush Chippers—Bulletin 2600/2640; Manually-fed Soil Shredders—Bulletin 112; Low-cost, high-capacity Mechanically Loaded Shredders — 24 Models — Bulletin ML-36; Vibrating Screens for preparing superfine media mixes — Bulletin PS 30/42.

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